U.S. PROFESSIONAL SERVICES MARKET

1988 - 1993

INPUT

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

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Abstract

This report analyzes the U.S. professional services market from 1988 through 1993. Data includes user expenditures, ranking by category of vendor, and comparisons of the shares held by the top ten vendors. Market size and growth rate estimates are provided for 14 industries.

The market is segmented into two sectors, commercial and federal government. A different segmentation is based on the following four delivery submodes:

- Software development
- Consulting
- Education and training
- Systems integration-related professional services

The report presents and analyzes the issues, trends, and significant events affecting the professional services market. The newest and fastest growing market opportunity, called systems integration, is discussed. The report identifies business and market opportunities and provides recommendations to vendors and users of professional services.

The report contains 129 pages and 85 exhibits and is part of a four-volume series discussing the U.S. information services market and its delivery modes. The three other volumes are:

- *U.S. Processing/Network Services, 1988-1993*
- *U.S. Software Products Market, 1988-1993*
- *U.S. Turnkey Systems Market, 1988-1993*

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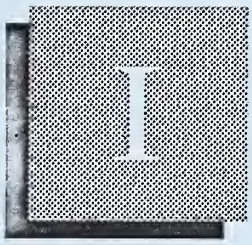
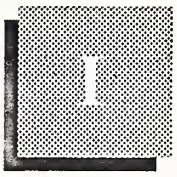


Introduction



Introduction

This report on professional services is part of a four-report series produced each year by INPUT's *Market Analysis and Planning Services (MAPS).* The series reflects the division of the U.S. information services (IS) industry by INPUT into the following segments, called "delivery modes:"

- Professional services
- Processing/network services
- Software products
- Turnkey systems
- Systems integration

Readers are encouraged to read the four companion reports in order to broaden their knowledge about the information services industry or to complement their interest in professional services.

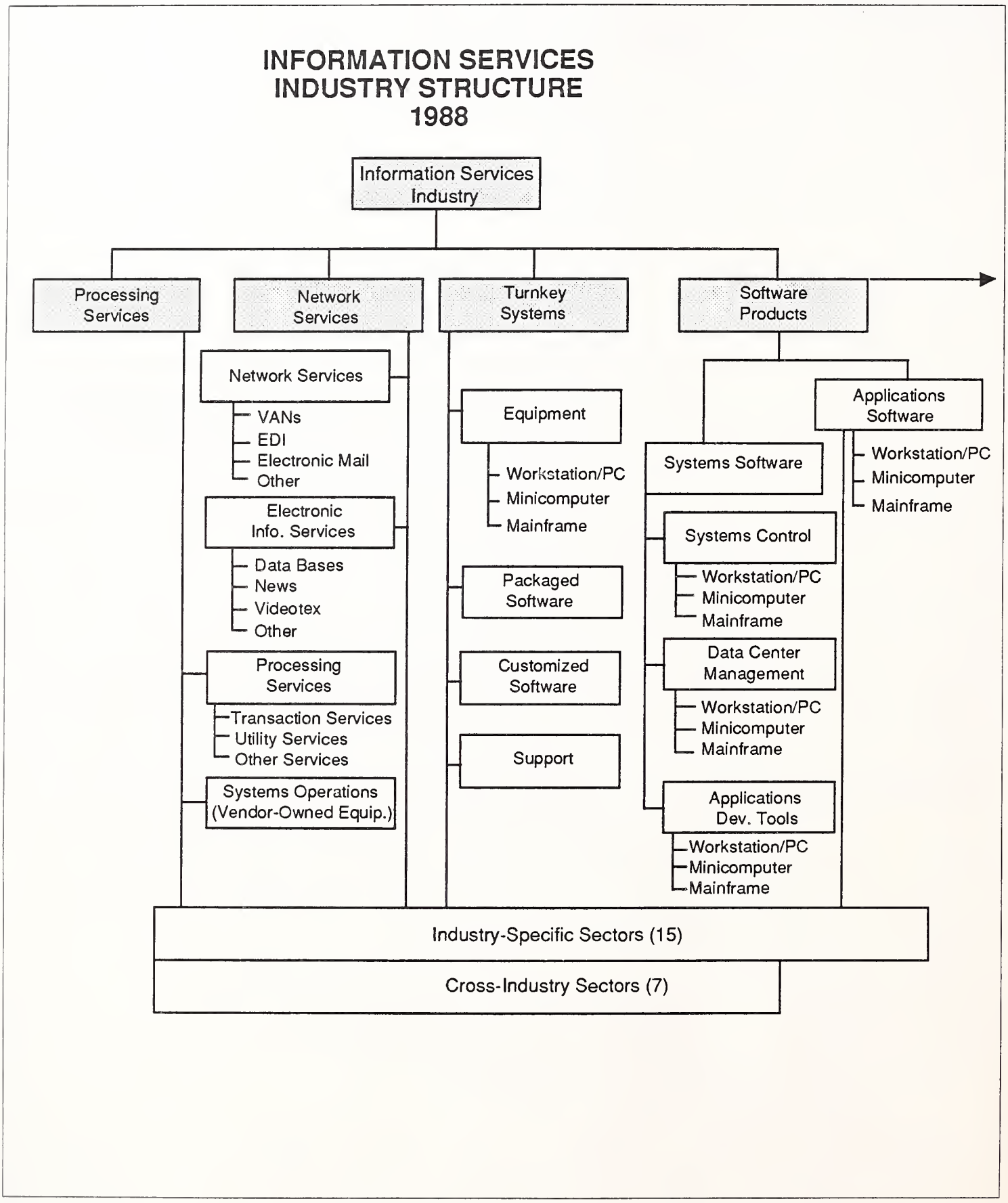
A Purpose of the Report

The *U.S. Professional Services Market, 1988-1993* report reviews and analyzes the professional services market and highlights the two markets—commercial and federal—for professional services.

The report provides readers with information and insights that will allow them to:

- Review the forces that are shaping the market
- Identify new markets and possible product opportunities
- Assess the product penetration of competitors
- Determine potential market directions
- Prioritize investment dollars

EXHIBIT I-1



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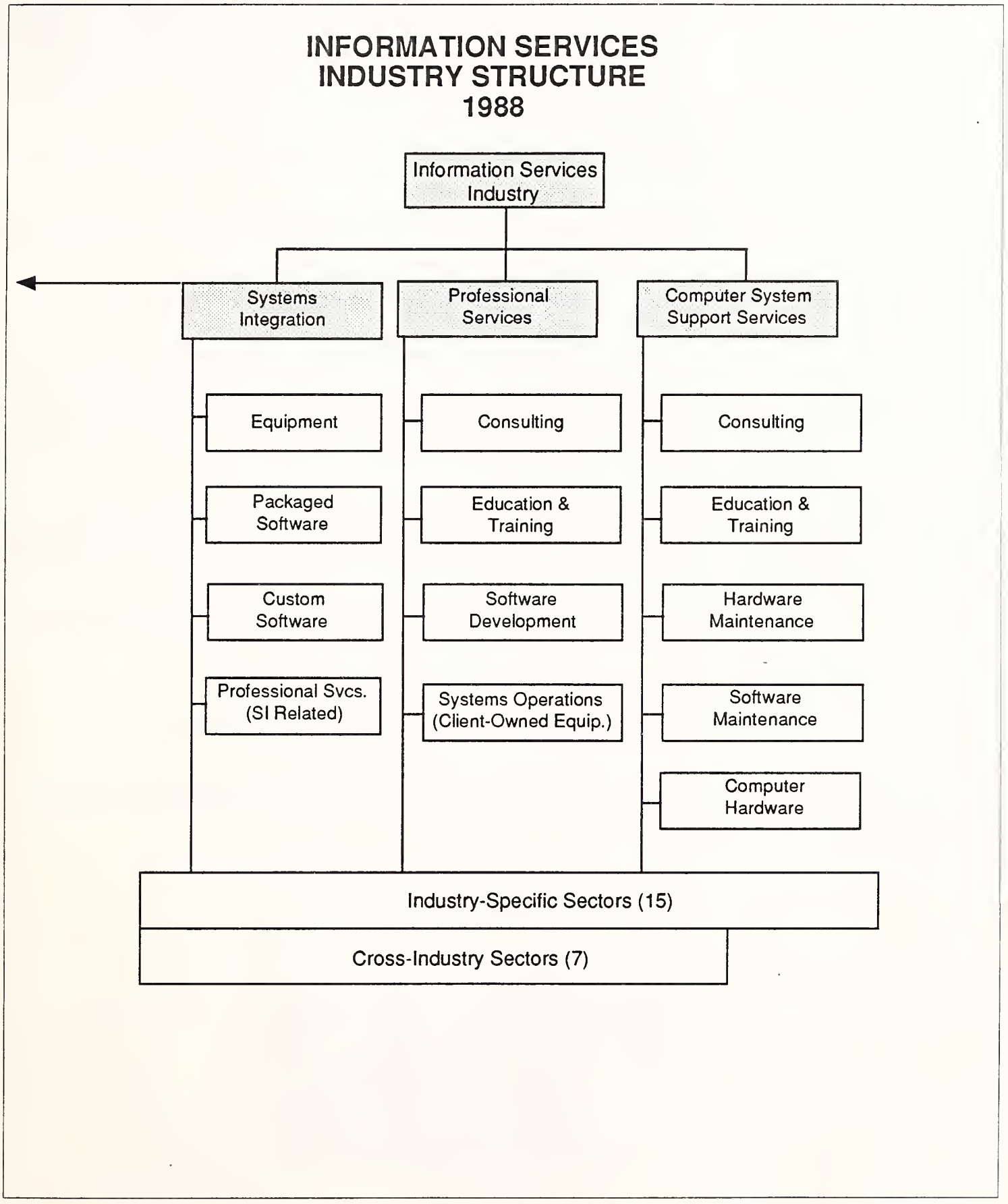


B

Scope and Organization

The report focuses on activities in the U.S. market and identifies user expenditures that are noncaptive (i.e., are generally available to vendors). This is important since some large organizations have information services divisions or subsidiaries that provide professional services largely to that corporate entity. In nearly all instances, these services are not awarded on a competitive bid basis.

The *U.S. Professional Services Market, 1988-1993* report is organized as follows:

- Chapter II, the Executive Summary, provides an overview of the report and highlights the most important information.
- Issues and Trends are identified and discussed in Chapter III.
- Chapter IV analyzes the market for professional services and forecasts user expenditures for the commercial and federal sectors. The market size and growth rates for 14 industry-specific market segments are presented, as well as a discussion of the key trends in each of the four delivery submodes.
- Chapter V focuses on the leading professional services vendors. Merger and acquisition activity and new entrants offering professional services are also identified.
- Opportunities and Recommendations are presented in Chapter VI.
- Appendix A includes INPUT definitions.
- Appendix B provides the data base for professional services.

C

Information Services (IS) Industry Structure

INPUT divides the information services industry into seven "delivery modes:"

- Processing services
- Network services
- Turnkey systems
- Software products
- Systems integration
- Professional services
- Computer systems support services

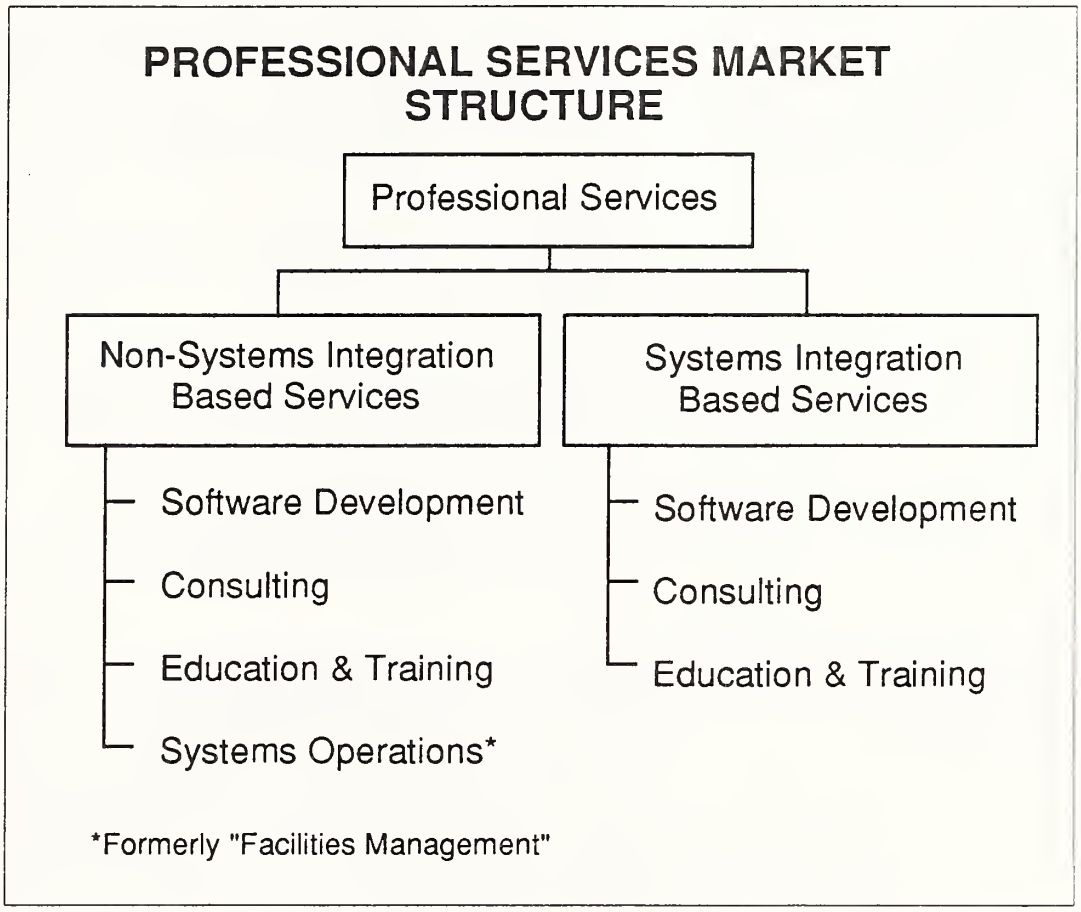
Exhibit I-1 indicates the industry structure.

D

Professional Services Market Structure

The focus of this report is on professional services. INPUT divides the professional services market into two key components shown in Exhibit I-2. The two key submodes of professional services are:

EXHIBIT I-2



- Systems integration-based services
- Non-systems integration-based services

As shown in the exhibit, "non-systems integration-based services" comprises the following subsegments:

- Consulting
- Education and training
- Software development
- Systems operations

Please Note: With this report, INPUT changes the name of the "facilities management" category to "systems operations." The new "systems operations" term will be used in all future INPUT reports.

"Systems integration-based services" includes the professional services offered by systems integrators and excludes expenditures for hardware used in commercial or federal systems integration projects.

The report will discuss activities and participants in each of the subsegments identified. Please refer to Appendix B for definitions of each professional services subsegment.

E

"Double Counting" of Certain Professional Services

As indicated in Exhibit I-1, certain computer-related professional services are offered by vendors selling hardware and related support services. Since INPUT's *Customer Services Program* closely monitors such user expenditures, there is some "double counting."

The overlap with customer services activities occurs in the following three categories:

- Consulting
- Education and training/documentation
- Software development/customization

The nature of overlap is discussed in greater detail in Chapter IV. The dollar amount of overlap is identified and reconciled in this chapter.

F

Definition of Systems Integration

The term "Systems Integration" (SI) has a dual meaning. The primary definition of "Systems Integration" represents a delivery mode—one of seven followed by INPUT—and, as such, includes user expenditures for hardware, software (systems and applications), professional services, and other. "Other" includes mainly specialized subsystems, such as energy management for an electrical utility, merged with other systems to form an integrated solution.

In the second definition, "Systems Integration" is one of two specific application areas under the generic heading "Professional Services." In this broad definition, SI is a type of professional service, comprising:

- Consulting
- Education and training/documentation
- Software development/customization

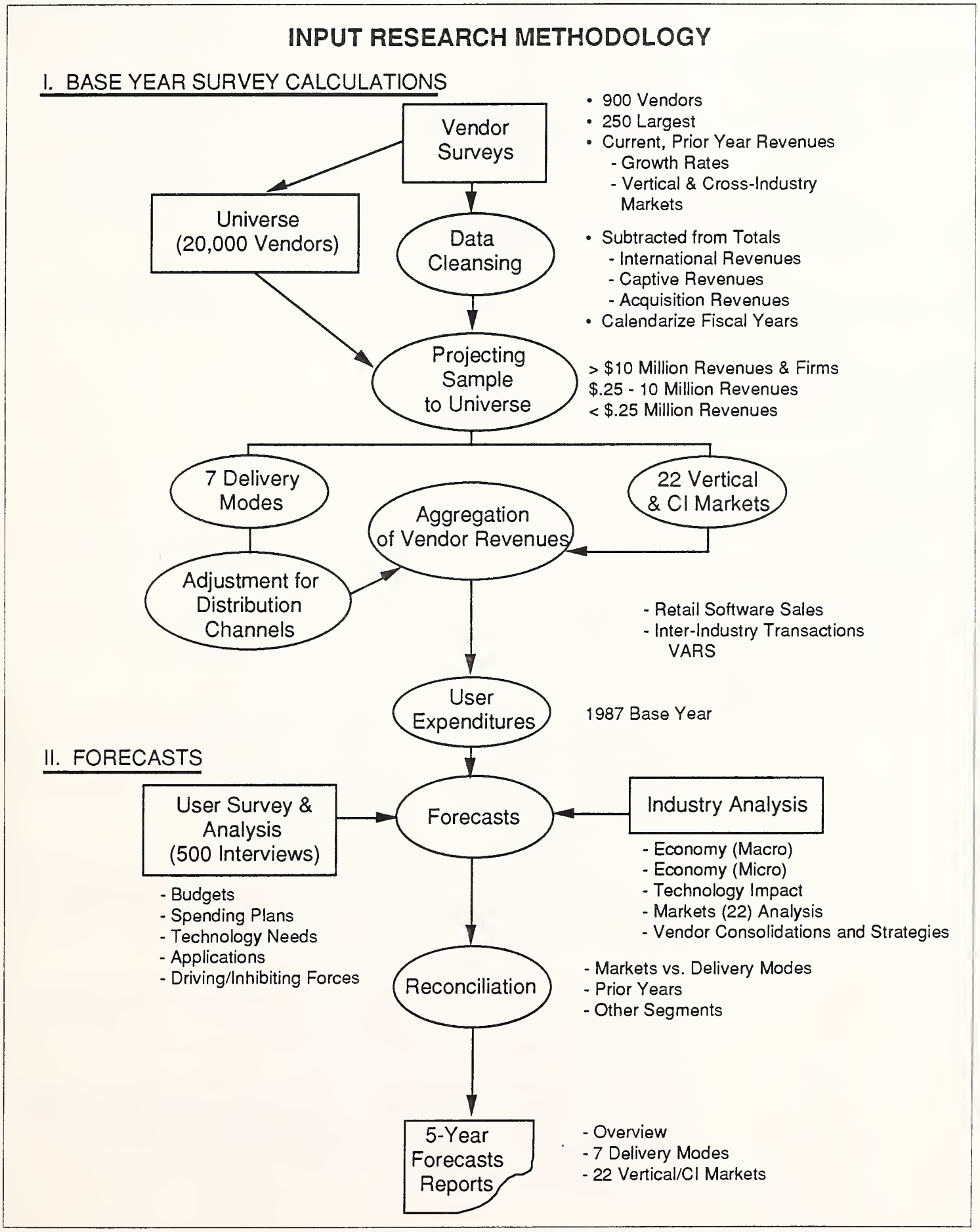
This report focuses on systems integration as used in the latter definition.

G

Research Methodology

INPUT methodology for data collection, analysis, and forecasting is depicted graphically in Exhibit I-3. During the second quarter 1988, INPUT conducted in-depth interviews with 910 information services vendors, including nearly all of the 250 largest firms. The smallest of this group of 250 vendors represented about $20 million in user expenditures in 1987.

EXHIBIT I-3



Of the 910 companies, revenues of the smaller 660 companies ranged from $250,000 to $20 million. Collectively, revenues from all 910 firms represented 70% of total information services industry revenues.

In the case of the few large vendors that did not respond to the survey, INPUT estimated vendor revenues from its own contacts and secondary sources. This estimation was accomplished for all firms with more than $10 million in annual revenues. For firms with revenues below $10 million (and not specifically covered in the survey), INPUT created a model based on the number of such firms identified in each delivery mode and their expected average annual revenues.

The sum of these surveys and estimates produced the initial vendor revenue estimates for 1987. From this figure, INPUT subtracted revenues identified as:

- International (non-U.S.)
- Captive (within the organization)
- Acquisitions (used only to calculate growth rate)

The revenue data in this report include only the following:

- U.S. revenues. Only revenues derived from products or services sold in the U.S. are included. All foreign revenues are excluded.

- Information services revenue. Revenues from two delivery modes—professional services and the professional services portion of the systems integration—are included.

- Noncaptive revenues. Only revenues available to all vendors in a competitive marketplace are included. Revenues derived from sales to partners or affiliated organizations are excluded. An example could be the sale of professional services from Unisys' Systems Development Corporation (SDC) to another Unisys division.

- Calendar year revenues. Approximately 30% of the vendors surveyed have fiscal years that do not coincide with calendar years. Revenues of these companies have been adjusted to a calendar year basis for consistency.

- Rounding of revenues. For large vendors, revenues were rounded to the nearest $1 million to normalize the lesser degree of accuracy when data was estimated by INPUT.

- Margin of error. Revenues reported by private companies, subsidiaries of large corporations, computer manufacturers, and international CPA firms are generally subject to a wider margin of error than reported revenues of other companies.

Companies that are not exclusively involved in information services are identified as follows:

- If a division or its subsidiary that markets all information services for a company is generally known by its own name, then it is identified by that name rather than the parent company's name. An example is Boeing Computer Services Company, a division of aircraft manufacturer, The Boeing Company.

- If more than one division or subsidiary markets information services, the information is included in, and identified by, the parent's name. An example is Control Data Corporation.

- Organizations are reported according to their legal status as of the end of December 1987.

Companies have been classified according to the delivery mode of service from which they derive the largest proportion of their U.S., noncaptive information service revenues.

Total base year revenues (1987) are then summed into six delivery modes and twenty-two vertical- and cross-industry segments for closer analysis and five-year projections.

INPUT considers industry revenue to include two separate subsets of data: (1) *User expenditures*, which equate with market size; and (2) *vendor revenues*. For certain delivery modes, vendor revenues and user expenditures are fairly close. However, many microcomputer software products, for example, are marketed through indirect distribution channels, such as retail stores, OEMs, and VARs, where conversion factors must be applied to determine the total market size based on vendor revenues. In addition, some software is sold by vendors into other information services sectors, such as processing services and network services. This software could be used in these other IS sectors' data centers and never be passed to the end user. INPUT deletes such "intraindustry" transactions from its user expenditure market data.

The following table shows the various conversion factors used by INPUT to convert vendor revenues to end-user expenditures (market size) figures for each delivery mode:

• Application software	1.18
• Systems software	1.10
• Turnkey systems	0.99
• Systems integration	0.99
• Professional services	0.99
• Network services	0.99
• Processing services	0.99

For the 1987 user expenditures defined in this report, INPUT projects five-year market growth rates for each delivery mode and vertical/cross-industry market, based on its own analysis of technology, vendor activity, driving and inhibiting forces affecting each market, and economic outlook.

H

Economic Assumptions

- The inflation rates used in the forecast data base are shown in Exhibit I-4.

EXHIBIT I-4

GNP NOMINAL GROWTH RATE ASSUMPTIONS
(Percent)

	1987A	1988E	1989E	1990E	1991E	1992E	1993E
Real GNP	3.4	3.1	2.8	2.5	2.8	3.0	3.0
*GNP Deflator	3.3	4.5	5.5	5.0	5.0	4.5	4.5
Nominal GNP	6.7	7.6	8.3	7.5	7.8	7.5	7.5

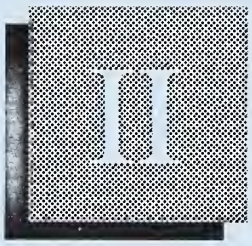
*Year-to-Year Comparisons

A = Actual
E = Estimates

Source: INPUT, based on data from U.S. Bureau of Labor Statistics

- For a complete view of the information services market, readers are encouraged to review the other INPUT reports. To gain a "bottom up" view of professional services within the information services business, INPUT recommends that the reader refer to the three-ring binders, provided as part of the MAPS program, that segment the IS market into 19 industry-specific and cross-industry sectors.

INPUT welcomes your comments, thoughts, and suggestions about this report.



Executive Overview

II

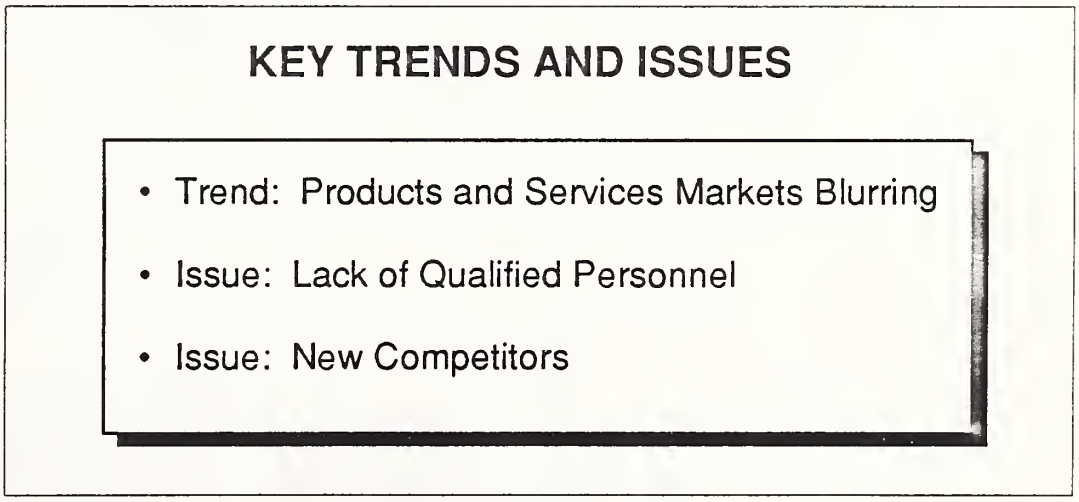
Executive Overview

A

Key Trends and Issues

In the overall information services (IS) business, the distinctions between products and services are blurring. No longer do companies specialize in a certain type of product or service. Traditional product companies are adding services; traditional service companies, such as the "Big Eight" public accounting firms, are adding products. In response to market demand, firms offer a full range of products and services aimed at specific industries, based on certain technologies, or utilizing select hardware platforms. Exhibit II-1 highlights an industry trend and two major issues for the professional services delivery mode.

EXHIBIT II-1



To put this changing market in perspective, the 1980s were characterized by software as the central delivery mode, unifying processing services, turnkey systems, professional services, and network services. For the 1990s, no single delivery mode will act as the unifying point for the remaining modes. Instead, in response to changing customer needs, "Integrated Solutions" will provide the core of the 1990s IS market structure, with "Supporting Services" enveloping the five delivery modes and "Integrated Solutions." In this view, product attributes will diminish in importance; customer support and related services will differentiate the leaders and followers.

INPUT identified two key issues—the lack of qualified personnel and new market competitors. The lack of qualified personnel to perform professional services stems from demographic trends and economic realities. The declining birth rate of the 1960s and 1970s has resulted in fewer entry-level programmer/analysts and consultants, and managers. In addition, professional services firms must identify and attract the right people, pay competitive wages and benefits, and maintain its professional staff through training classes.

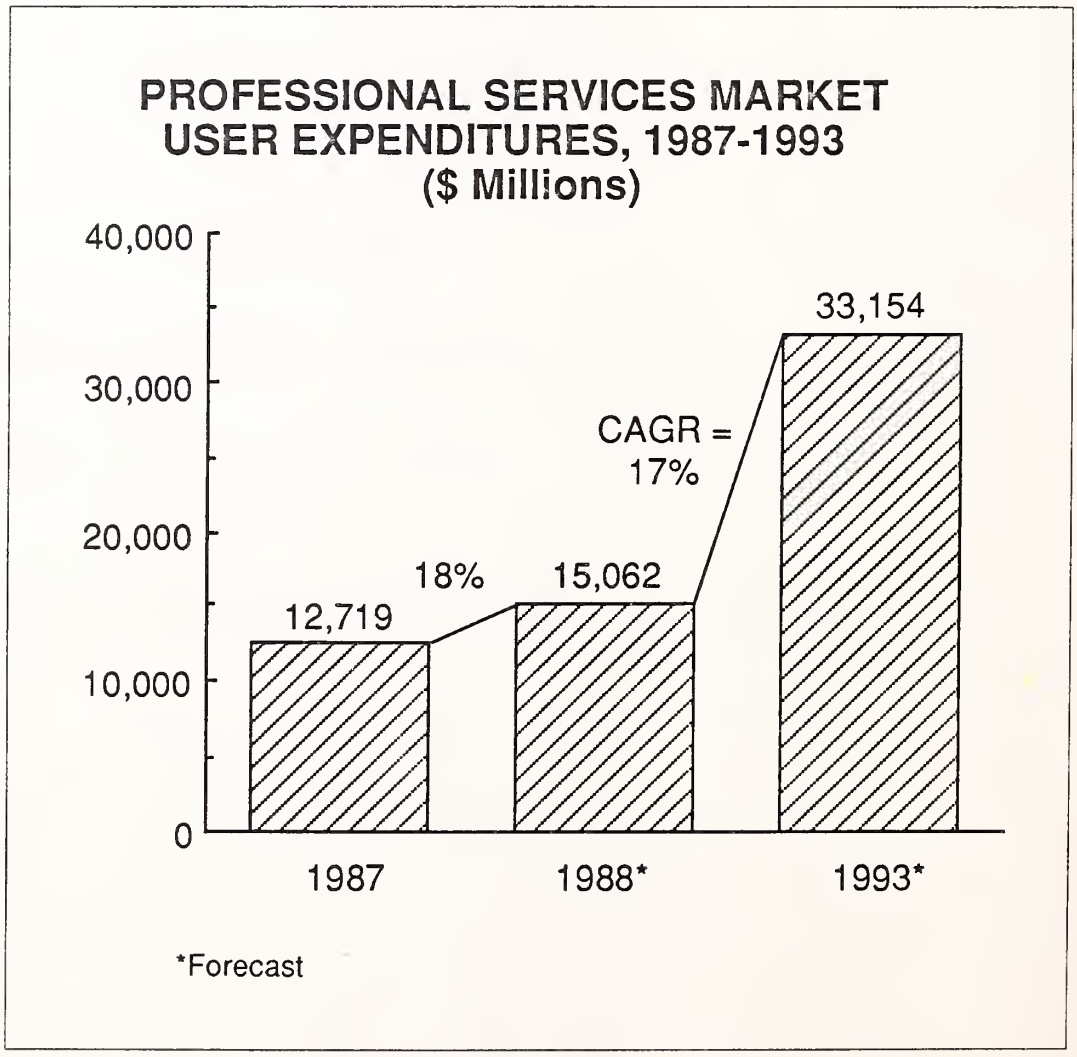
"Pure" professional services firms no longer have the professional services market to themselves. INPUT identified 14 categories of vendors, many of which are relatively new, offering professional services. Well-financed firms, such as computer hardware manufacturers, subsidiaries of aerospace/defense firms, and not-for-profit organizations, represent formidable competition to established professional services vendors.

B

Professional Services Market User Expenditures

In 1987, users spent $12.7 billion in the U.S. for professional services. As indicated in Exhibit II-2, user expenditures are expected to grow 18% in 1988, reaching $15.1 billion.

EXHIBIT II-2



Between 1988 and 1993, INPUT expects the professional services market to grow at a compound annual rate of 17% to $33.2 billion. The next two exhibits provide important breakdowns of user expenditures.

The professional services market comprises four segments:

- Software development
- Consulting
- Education and training
- Systems operations (formerly called "facilities management")

As shown in Exhibit II-3, in 1987 users spent $7.5 billion, nearly 60% of the professional services market, for software development. User expenditures in the second largest segment, consulting, represented about one-third of those for software development. Expenditures for education and training and systems development accounted for $1.6 and $1.0 billion, respectively.

EXHIBIT II-3

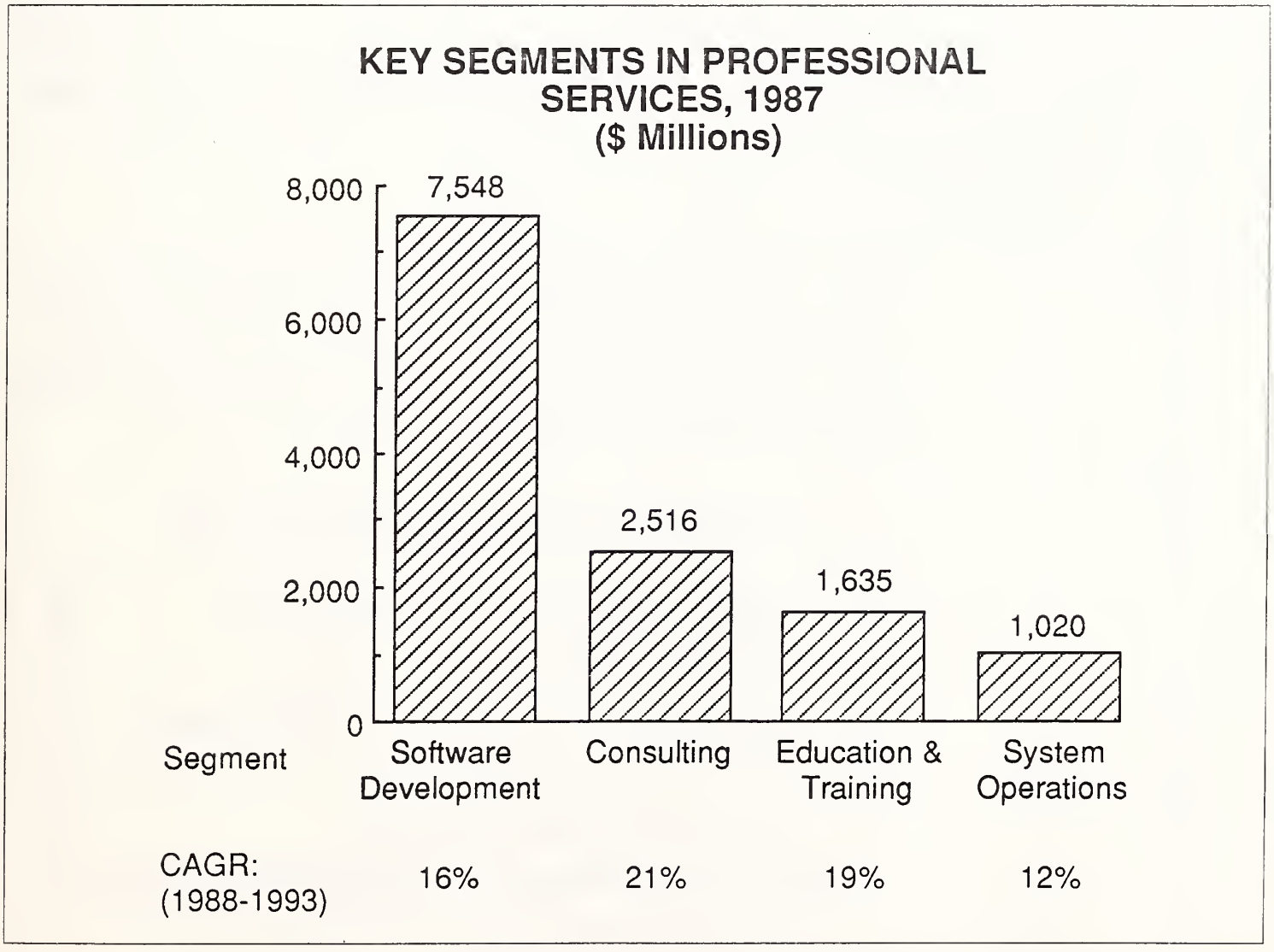


Exhibit II-4 indicates user expenditures by functional area. Three major functional areas, manufacturing/business, accounting/administration, and data processing/telecommunications together accounted for 70 percent of 1987 user expenditures.

EXHIBIT II-4

USER EXPENDITURES
TOP THREE FUNCTIONAL AREAS, 1987

Functional Area	User Expenditures ($ Millions)	Percent of Total Market
Manufacturing/ Business Operations	3,819	30
Accounting/Administration/ Office Systems	2,913	23
Data Processing/ Telecommunications	2,149	17

C

Impact of Systems Integration

INPUT defines systems integration as those projects completed either in-house or by a third-party vendor in excess of $0.5 million, with identifiable hardware and professional services components. With this year's annual reports, INPUT inaugurates tracking of system integration expenditures as a separate delivery mode. Exhibit II-5 summarizes the impact of systems integration on professional services.

EXHIBIT II-5

IMPACT OF SYSTEMS INTEGRATION

- Overall: Logical Extension of Professional Services to Larger Projects
- Commercial: More Vendors Offering Professional Services
- Federal: High-Growth Segment

Systems integration represents a logical extension to the professional services business. Vendors that have demonstrated an understanding of the client's business, project management, and scheduling are likely to qualify for more lucrative projects involving the purchase of hardware. Mergers and acquisitions in the professional services business has resulted in fewer but larger and financially stronger vendors, necessary in some clients' views to qualify to handle large, risky systems integration projects.

In the commercial market, however, the larger systems integration vendors will continue to offer professional services, thus validating INPUT's notion of the increased importance of support services. Systems integration, now playing a major role in the federal sector, will represent one of the fastest growing areas in the federal market over the intermediate term.

D

Leading Vendors in Professional Services

User expenditures with the "top 10" vendors, listed in Exhibit II-6, together represent about 33% of total 1987 user expenditures in professional services.

EXHIBIT II-6

TOP 10 PROFESSIONAL SERVICE VENDORS 1987

Rank	Vendor	Professional Services User Expenditures ($ Millions)
1	IBM	1,016
2	CSC	521
3	MITRE	415
4	Unisys	414
5	Andersen Consulting	381
6	Emhart/PRC	298
7	BDM International	286
8	TRW	273
9	BCS	217
10	Peat, Marwick, Main	190
10	Coopers & Lybrand	190

Please note that the top 10 vendors come from five vendor categories:

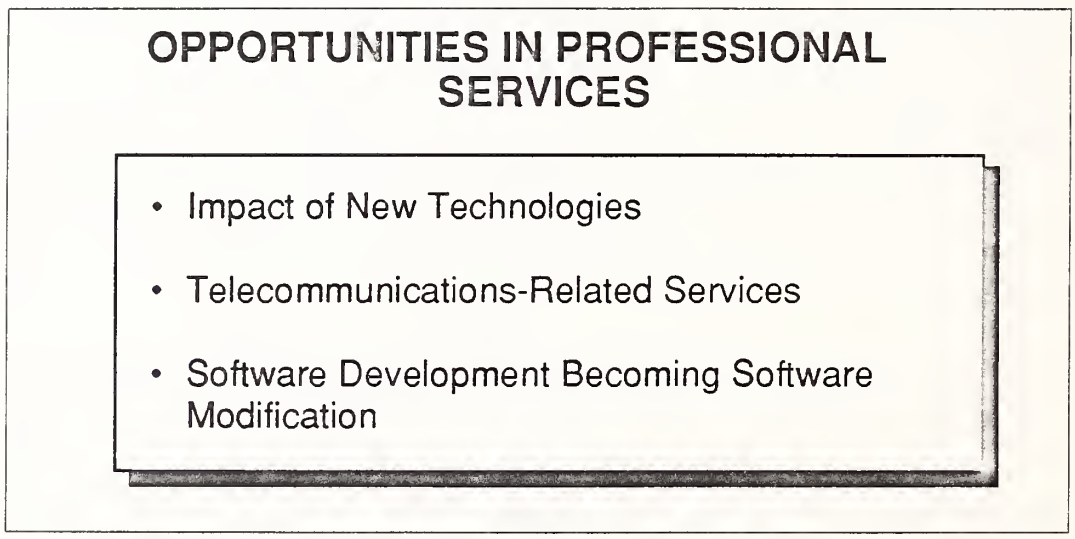
- Hardware manufacturers (IBM, Unisys)
- Professional services firms (CSC, Emhart/PRC, BDM International)
- Not-for-profit organizations (MITRE)
- "Big Eight" public accounting firms (Andersen Consulting; Peat, Marwick, Main; Coopers & Lybrand)
- Diversified manufacturing companies (TRW, BCS)

E

Opportunities in Professional Services

Although professional services is a huge ($12.7 billion) market, a number of opportunities exist. Exhibit II-7 lists three key opportunities.

EXHIBIT II-7



First, the constant stream of new technologies will create opportunities for professional services vendors. New hardware products include:

- IBM's AS/400
- New generations of Unisys, Honeywell, and NCR mainframes
- Optical disk storage subsystems

New software products providing professional services vendor with opportunities include:

- The UNIX operating system
- Artificial intelligence/expert systems
- Relational data base management software
- Distributed (processing) relational data base software
- Fourth-generation languages (4GLs)
- Image processing and storage

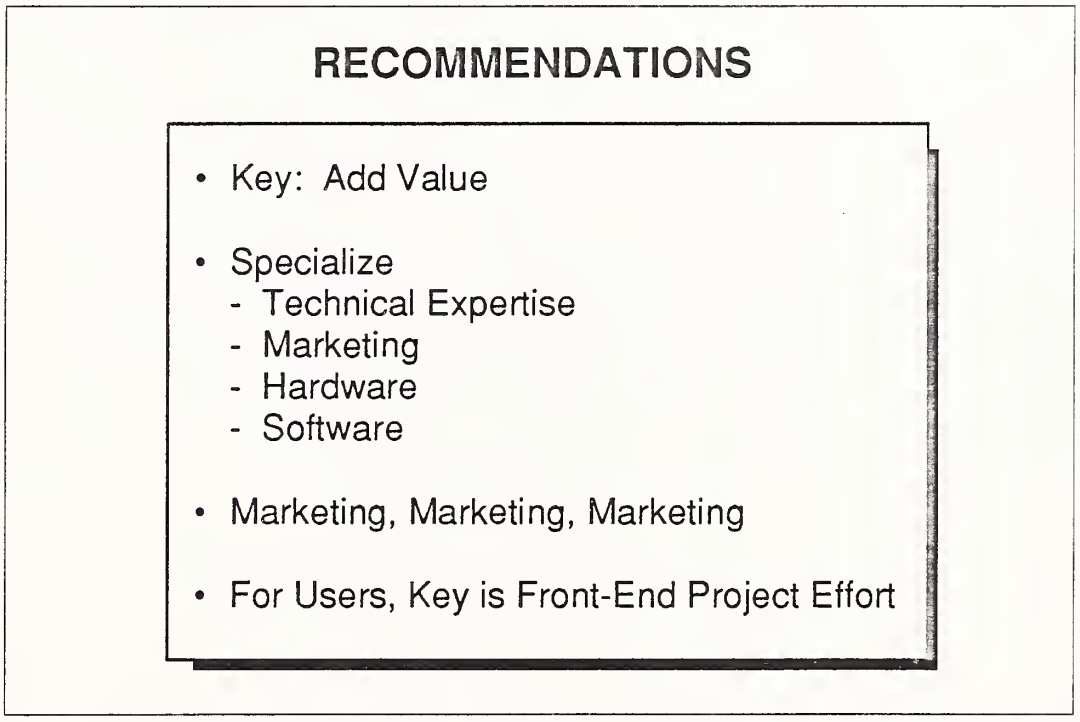
Second, telecommunications is a hot application area. New services for network design and installation, and network management represent opportunities for professional services firms and entry points for Regional Bell Operating Companies (RBOCs).

Third, application software vendors have done an excellent job of writing software that meets about 80% of user needs. As a result, professional services firms do not have to develop software from scratch. Instead, these firms will continue the shift from "software development" to "software modification." INPUT sees substantial opportunities to provide ongoing software modification and maintenance support.

F
Recommendations

INPUT's recommendations, contained in Exhibit II-8, are targeted to professional services vendors and users.

EXHIBIT II-8



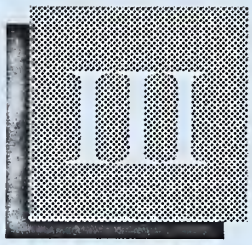
For vendors, the key is adding value. INPUT believes that the industry will further divide itself based on the degree of added value. Value can be added through specialization, such as:

- Specializing in certain hardware platforms
- Emphasizing select systems software (e.g., relational data base management software)
- Understanding a certain industry
- Providing limited services in a specific geographic area
- Offering a full range of professional services worldwide

Marketing will separate the successful vendors from the not-so-successful ones. Marketing implies a better understanding of the user's needs, an

understanding of the competition, service alternatives, development of profitable new services to meet these needs, and emphasis on solutions not technology.

For users, professional services projects will grow in importance as the integration of existing and new systems dramatically impacts business operations. The key here is spending the time and effort, before a project begins, to determine exactly what is needed, who will work with the vendor(s), milestones, frequency of review meetings, and problem resolution procedures. If professional services projects are to be successful, then senior corporate managers must be involved from the start.



Issues and Trends

III

Issues and Trends

A

Introduction

Before discussing the professional services market and competitors, it is useful to identify and discuss key issues and trends in the information services (IS) business.

Certain issues and trends discussed below are common to the overall IS industry; others focus on the U.S. professional services market.

B

Information Systems and Services—Major Issues

Major user issues are identified in Exhibit III-1.

First and foremost, senior corporate management expects more of the IS organization than at any time in the past. These expectations focus on getting more work out of the internal IS organization while carefully monitoring or reducing IS expenditures.

EXHIBIT III-1

INFORMATION SYSTEMS—MAJOR ISSUES

- Rising Management Expectations
- User Demands for Increasingly Complex Solutions
- Managing the Technology Investment
- Integration of Data/Technology/Applications
- Delivery of "Mission Critical" Systems

Users are becoming more sophisticated. Since two generations of users have worked within highly automated environments, users have realized the advantages over less automated methods. Now, department managers and supervisors seek more complex solutions to increasingly complex business problems brought on by deregulation, increased foreign competition, and changes to the growth sectors of the U.S. economy. IS management's task is compounded by the heavy installed base of incompatible products and the number of new hardware, software, and communications products available.

Technology is now viewed as a long-term investment rather than a short-term operating expenditure. As a result, a different approach to define standards and measure results is being taken.

The integration of data, technology, and applications is another way of stating that the industry has moved full circle from "pushing iron" (selling computer hardware and systems software) to "solution selling." Stated simply, users want a workable solution, not more razzle-dazzle technology-based products.

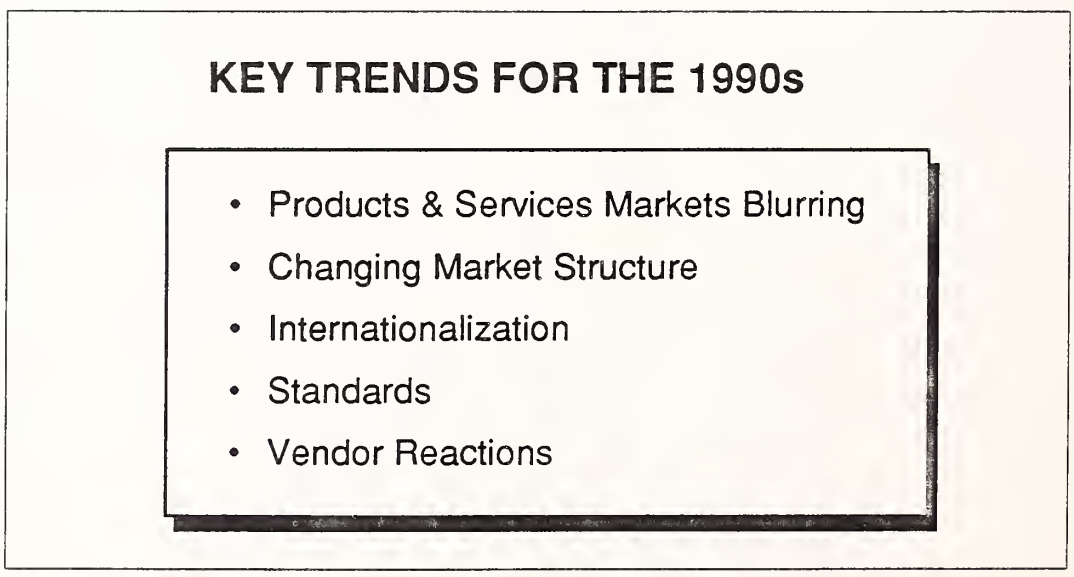
Finally, IS is being called on to deliver a company's knockout punch capability—a system central to business operations. These "mission critical" systems not only help run the business, but provide the basis for establishing a competitive advantage.

C

Key IS Trends for the 1990s

INPUT characterizes the IS market in the 1990s with the five statements shown in Exhibit III-2.

EXHIBIT III-2



Products and services markets are blurring. Essentially, product-based companies are adding IS services; suppliers of IS services are adding IS products. These additions may take the form of direct sales or alliances or joint ventures to market new products or services.

The structure of the IS market is changing. INPUT believes "software" as the unifying force in IS will yield "integrated solutions" which, in turn, will give way to a combination of "integrated solutions and supporting services" in the 1990s.

A dominant trend of the 1990s is that IS markets will be international in scope.

Standards, both technical and human, will likely be driven by systems and applications software, rather than the change coming from the hardware side.

Finally, vendors will react through more focused marketing efforts. One who does "marketing for a software vendor" will get some long overdue respect.

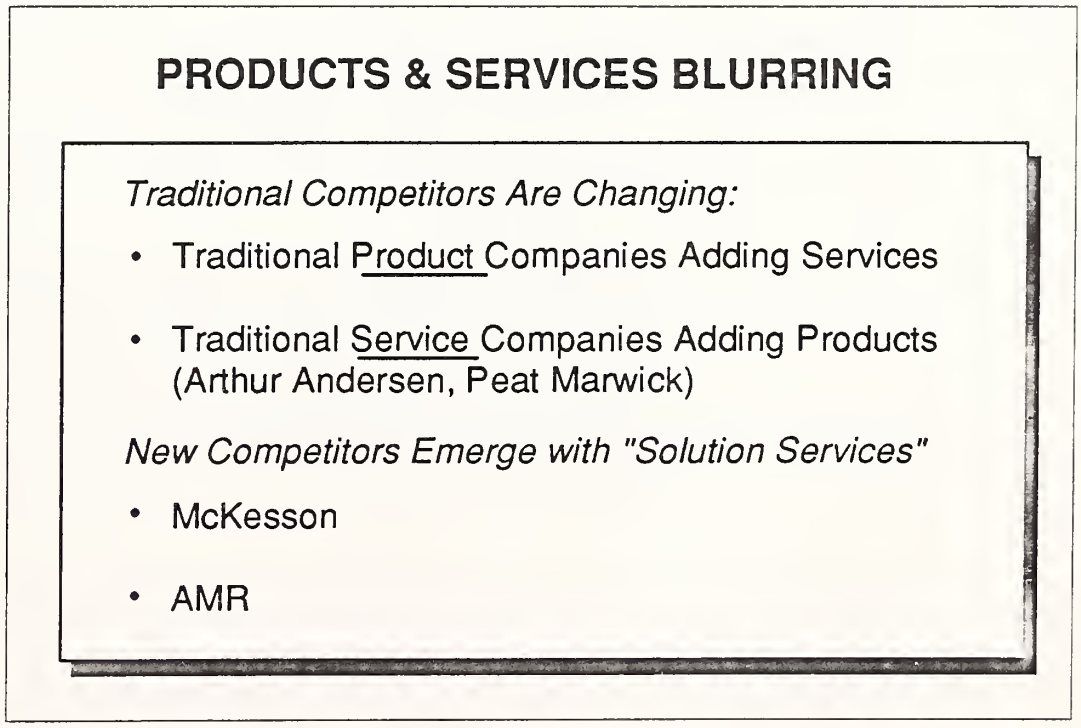
These trends are sufficiently important to merit a more complete discussion of each.

D

Trend—Products & Services Markets Blurring

IS competitors are rapidly changing. As indicated in Exhibit III-3, traditional hardware or software product vendors are adding services, while traditional services-based companies are selling hardware or software. Specifically, IBM, Digital Equipment, and Apple Computer have all formed separate divisions to provide IS services. Subsidiaries of "Big Eight" public accounting firms are selling proprietary software products or developing alliances with (and gaining expertise in) many hardware products.

EXHIBIT III-3



New competitors that sell complete solutions are emerging. Vendors in manufacturing, distribution, and services now offering IS-related services include:

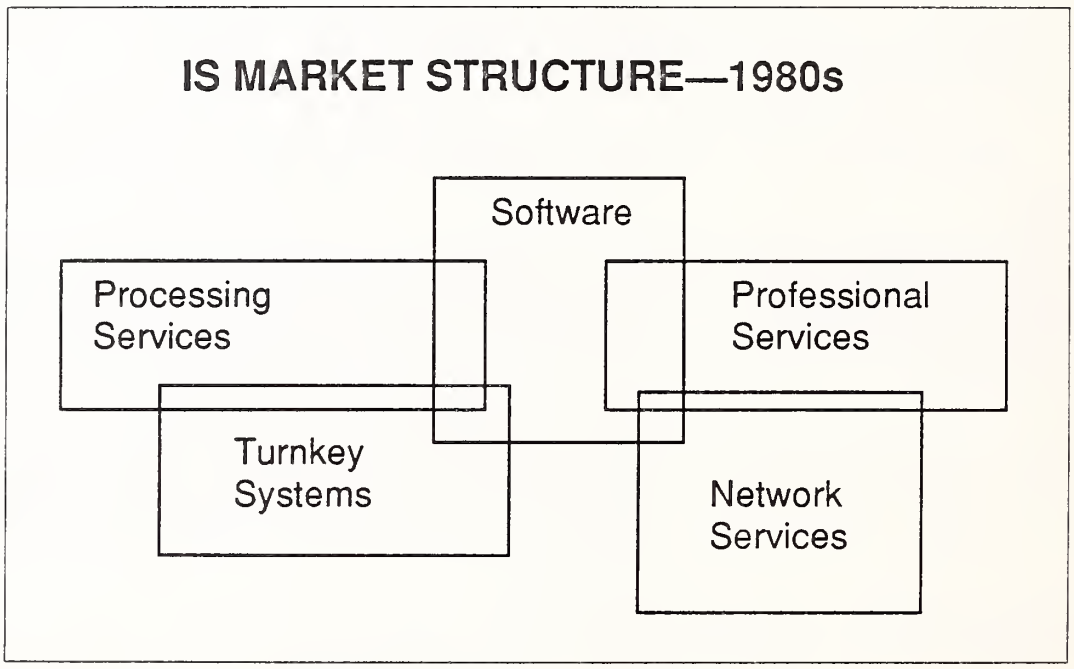
- Manufacturing: Pennzoil, John Deere, CSX, and Bethlehem Steel
- Distribution: Foremost-McKesson
- Services: AMR (American Airlines) and Ameritech

E

Trend—Changing IS Market Structure

The next three exhibits depict INPUT's view of the changing IS market. The IS market in the 1980s, portrayed in Exhibit III-4, has software at its center. Software integrates the other four IS delivery modes—processing services, turnkey systems, professional services, and network services.

EXHIBIT III-4



Two exhibits present slightly different views of the IS market in the 1990s. In Exhibit III-5, the need for integrated solutions unifies the five IS delivery modes.

It is believed that users' needs will not be fulfilled through the offering of integrated solutions. Taking the longer-term view shown in Exhibit III-6, the real unifying force in the industry will be the support services. Whether a customer buys from a vendor of hardware or software, processing or professional or network services, or turnkey systems, one of these vendors will act as the primary integrator through its support services.

EXHIBIT III-5

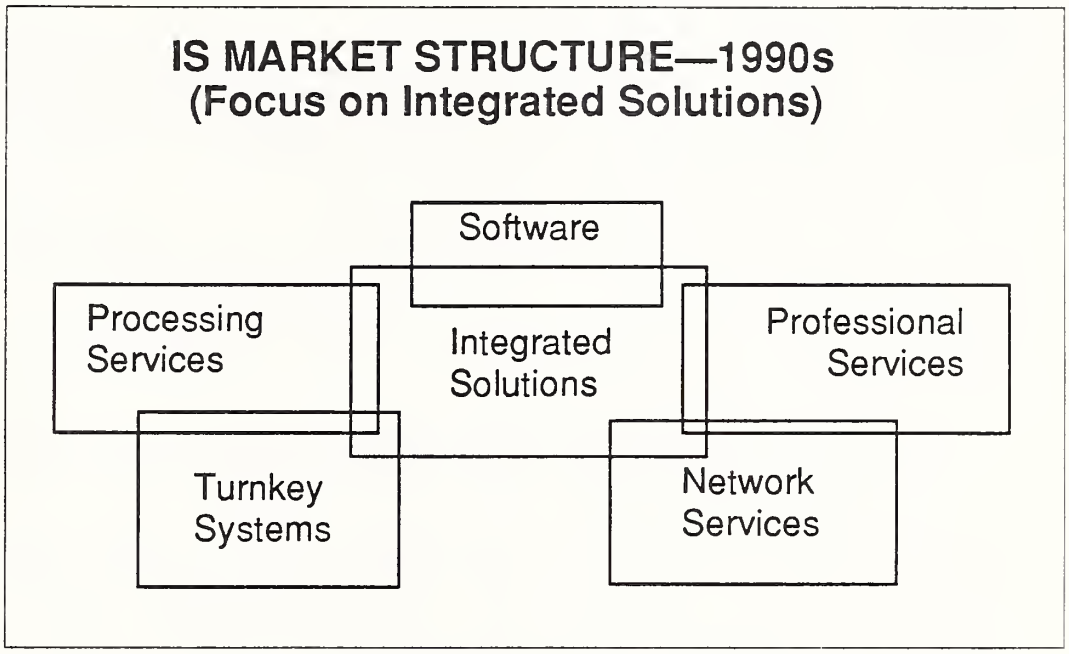
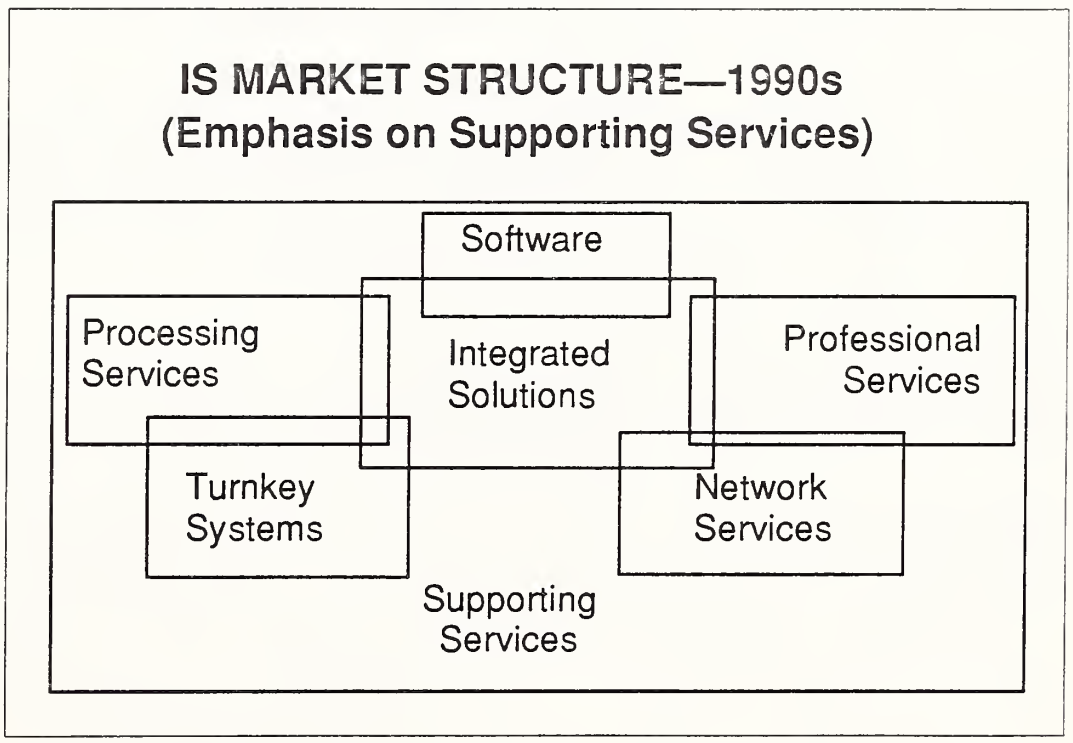


EXHIBIT III-6



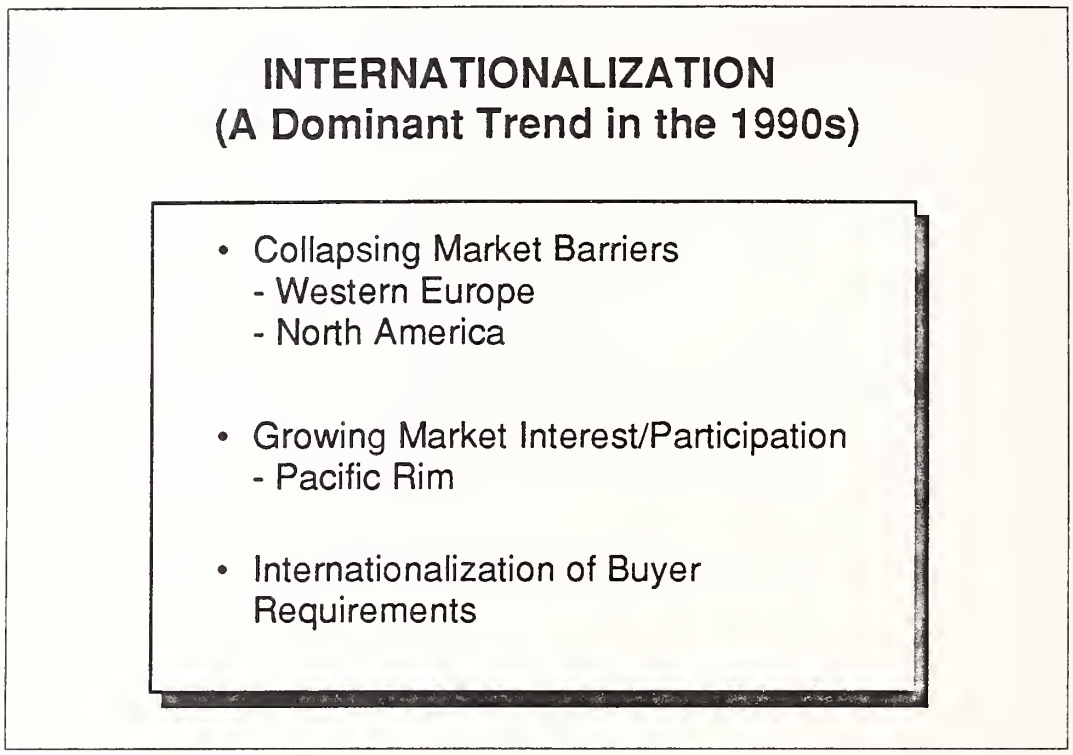
F

Trend—IS Market Internationalization

Like the manufacturing and financial markets, the IS market is broadening the scope of its products and services, being driven by legal considerations and actions by vendors and buyers.

As indicated in Exhibit III-7, market barriers in two key markets, Western Europe and North America, are breaking down. The 1992 agreement between European Economic Community (EEC) member states will ease movement of goods, services, and capital. In North America, trade barriers between Canada, Mexico, and the U.S. are rapidly diminishing.

EXHIBIT III-7



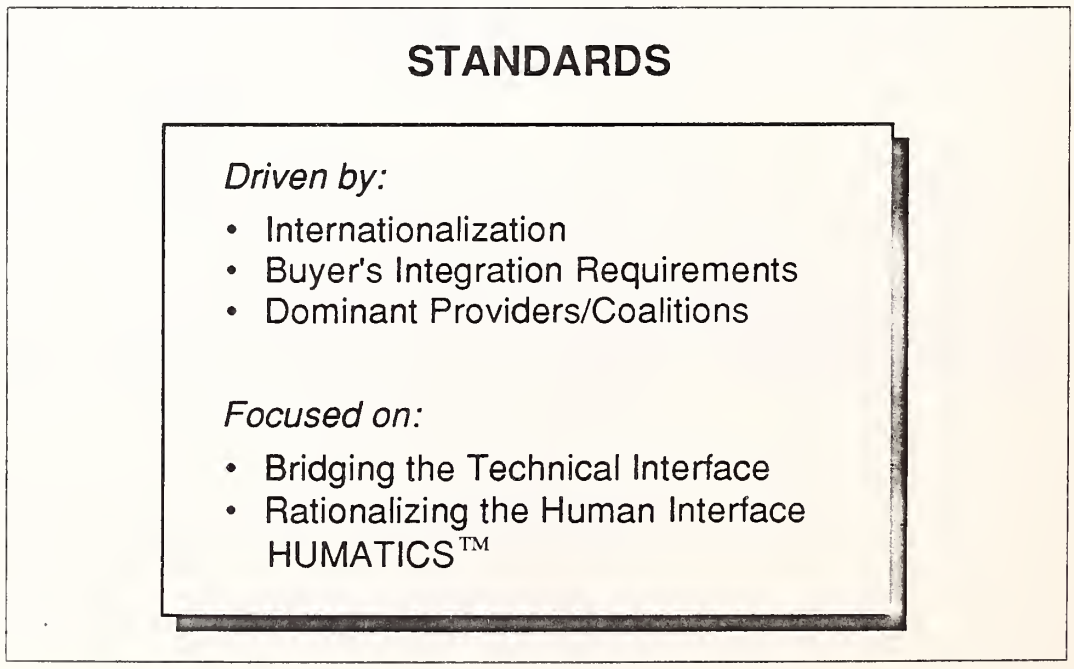
Customers buying IS products and services are requesting some form of international capabilities in their specifications. These international capabilities include support for certain international communications protocols, networks of systems performing distributed processing, and most importantly, post-sale service and support in cities in Western Europe and the Far East.

G

Trend—Emergence of Standards

The IS business has been characterized by vendors paying only "lip service" to supporting industry software standards. Exhibit III-8 lists three driving forces pushing vendors to implement and support standards.

EXHIBIT III-8



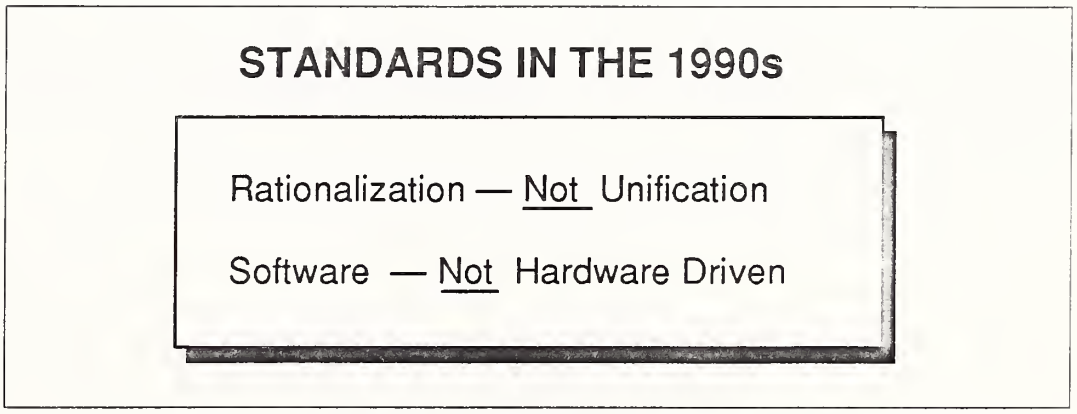
Internationalization of vendor requirements and the product and service offerings means certain common elements must be offered in order to win new customers. Buyers' needs for integrated hardware and software products are also forcing adoption of standards in vendors' product lines. Coalitions between the leading hardware vendors and key vendors of software and services, in order to reduce the number of products supported, provide yet another driving force for standards.

The demand for standards has pushed vendors to establish two levels of standards:

- Technical interface (between various IS products and services)
- Human interface (between IS products/services and end users)

Exhibit III-9 summarizes the situation in the 1990s for standards. Although common standards can be agreed on, it is not without substantial risk that a vendor could wholeheartedly support a particular standard. More vendors will rationalize the "rightness" of their standard, rather than offer and support more than one standard. The net effect will show little progress toward "unlocking" users from proprietary products.

EXHIBIT III-9



The limited progress expected, is likely to be driven by software, rather than hardware. Why? Because it is less threatening for a vendor to offer certain user interfaces or common elements with other software products—as long as the software does not transport easily to another vendor's hardware.

H

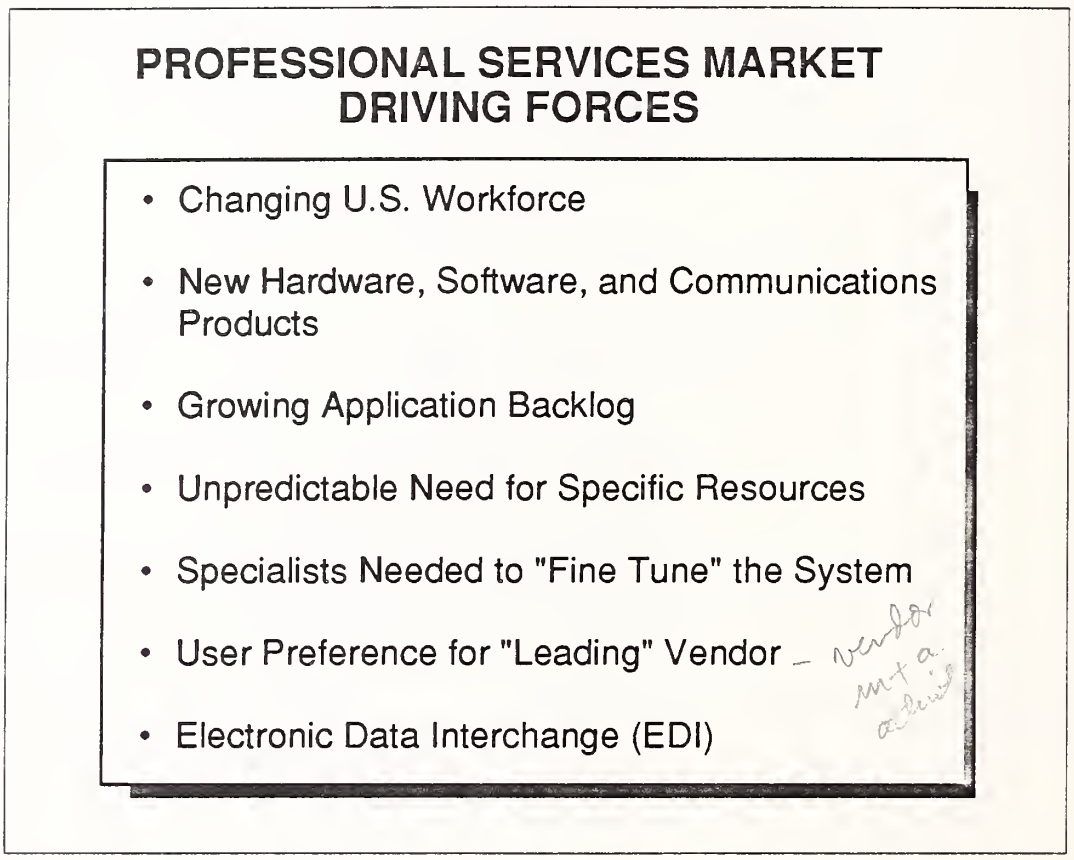
Professional Services Market Driving Forces

Seven factors influencing the growth of professional services have been identified by INPUT and are shown in Exhibit III-10. While each is important, the first five have a greater impact on the use of professional services.

As a result of different demographic patterns, the U.S. workforce is changing. Declining birth rates and the decreasing number of college graduates entering scientific/technical fields are combining to yield a limited pool of professionals to work in the IS market. As a result,

companies are turning to professional services vendors to provide specific technical capabilities.

EXHIBIT III-10



New hardware, software, and communications products strongly influence growth in professional services. The IBM AS/400, Digital Equipment's VAXcluster, and new multiprocessor hardware families from Amdahl, Unisys, NCR, and Honeywell require specific skills in order to get maximum system performance. IBM's Systems Application Architecture (SAA), designed to provide a linkage for users of disparate systems at the application software level, substantially boosts the opportunities for professional services vendors. Communications products such as local- and wide-area networks, integrated voice/data applications, and micro-to-mainframe links provide new opportunities for professional services vendors.

Despite all the talk about new ways to reduce the growing applications backlog, the backlog has actually grown, according to reports in *Information Week* and *Computerworld Focus*. Coupled with new software development and maintenance methodologies, professional services vendors can provide assistance on the most important applications or those with heavy communications content.

User organizations do not always have a consistent, predictable need for persons with specific training. Professional services vendors help alleviate the situations where specific skills are needed on these important projects.

Professional services vendors can help fine tune the performance of systems in two ways:

- For existing systems, fine tune the operation to prevent or delay spending for additional peripherals or CPUs
- For sites adding new hardware, ensure a smooth transition and optimal performance

Professional services help hardware and system software vendors maintain account control by enabling the vendors to better offer users "one-stop shopping."

Finally, electronic data interchange (EDI) and its heavy communication component requires expert assistance, available through professional services vendors, to implement.

I

Professional Services Market Growth Inhibitors

As a group, the four growth inhibitors, identified in Exhibit III-11, are characteristics of large, mature industries.

One driving force, the lack of qualified personnel, reappears as a growth inhibitor. While end-user organizations are having difficulty in attracting qualified personnel, so are professional services vendors! In fact, one leading professional services organization recently stated that "attracting and retaining qualified personnel" is its highest short-term priority.

EXHIBIT III-11

Since professional services vendors offer expertise in specific hardware, software, communications, or integration, they must provide extensive training to their in-house staff. This expensive requirement will result in segmenting professional services vendors into those offering lower- and those offering higher-added value services. Products requiring the most training and expertise, such as data base management software, CASE methodologies, artificial intelligence, and understanding of system internals permitting system integration, will automatically mean higher added value and higher prices.

Packaged software products offer a viable alternative to professional services. It is to the credit of the packaged software vendors that they understand most industry applications well enough to develop packages that meet at least 80% of users' needs. In this sense, a key aspect of professional services, software development, will move from custom work to package modification.

While users realize they can get a complete solution through professional services vendors, they too can provide such services on an internal charge-back basis, timing permitting. Most importantly, IS managers may not want to forego the lessons learned by doing some level of professional services in-house themselves. In some corporate cultures, giving up control to third-parties is unacceptable.

In total, growth will slow somewhat. Peaks will occur just after a new product cycle and valleys are most likely when the largest companies have digested the latest round of products.

J

Vendor Reactions to Trends

Moving beyond standards, successful vendors will react to the challenges just discussed. Exhibit III-12 lists three likely reactions:

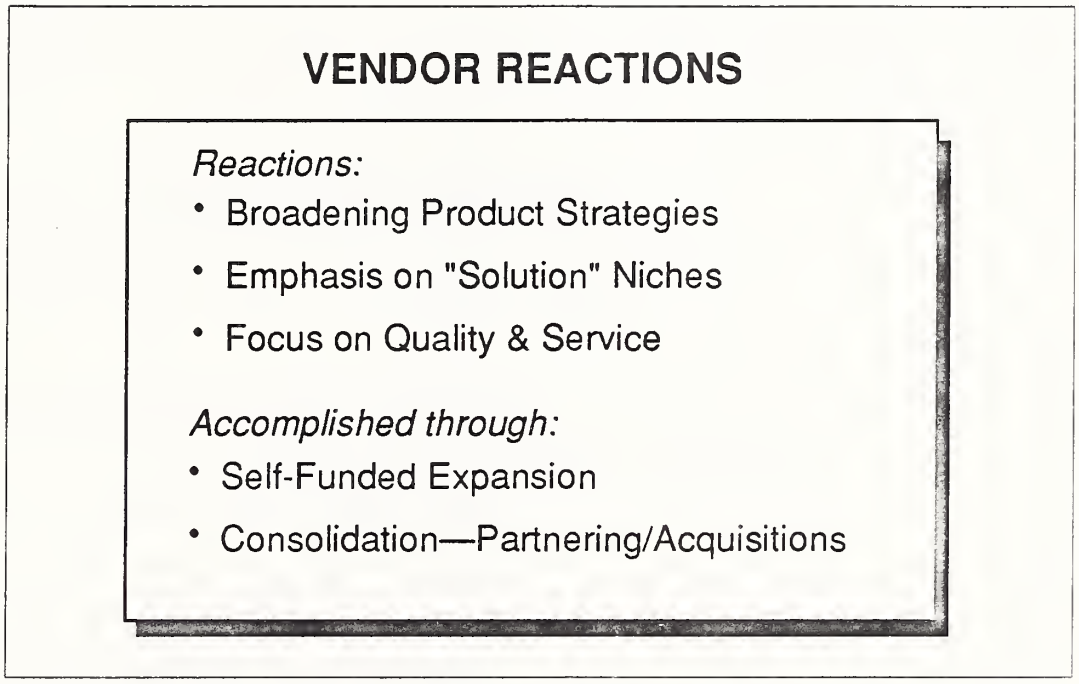
- Broaden product strategies
- Emphasize "solution" niches
- Focus on quality and service

At the base of the solution, vendors will broaden their product strategies, focusing on fully integrated hardware, software, and support solutions. Software vendors will support fewer hardware platforms and hardware vendors' third-party software directory will become their most important marketing tool.

Focus on certain products in and of itself will not permit vendor survival. Successful hardware, software, and services vendors will expand their focus to include quality and customer service. Fewer "DOA" processors and peripherals, fewer "bugs" in systems and application software, and better user and technical documentation will sell more products.

To implement these ambitious plans, the most likely approaches will include self-financed expansion and marketing alliances or partnerships.

EXHIBIT III-12

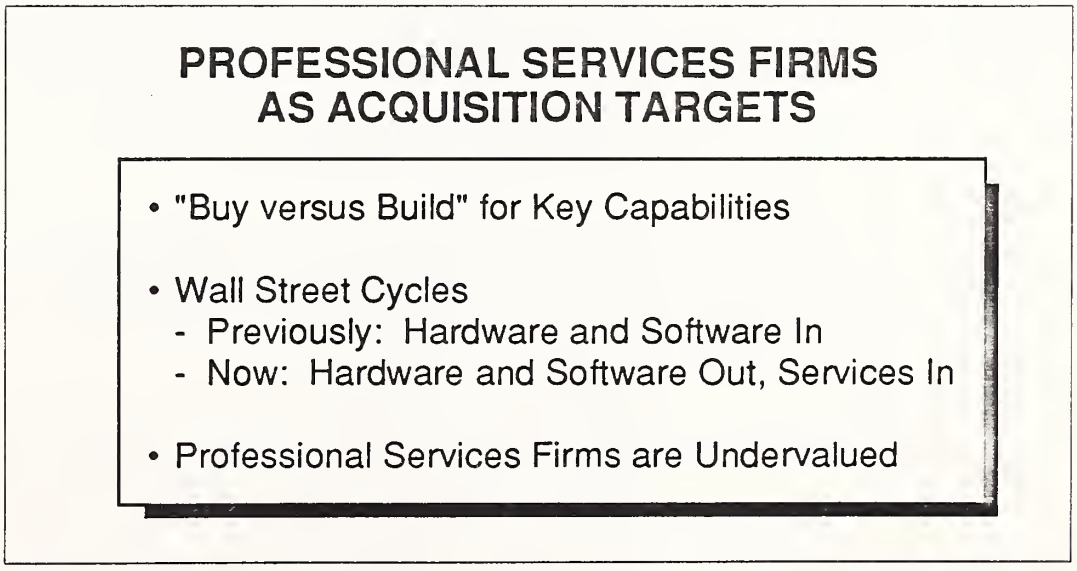


K

The Role of Acquisitions in Professional Services

Acquisitions have always represented one solution to the age-old "build versus buy" dilemma. Professional services firms are no different from hardware, software, or manufacturing firms. For the reasons indicated in Exhibit III-13, we are seeing more acquisitions involving professional services firms.

EXHIBIT III-13



At this time, professional services firms are "in" on Wall Street, having displaced software vendors which, in turn, displaced computer systems manufacturers. For professional services firms as a group, key financial indicators—price/earnings ratio, cash flow, debt:equity ratio, gross

margin, and net profit—show good investment opportunities. Relative to the market, professional services firms may be undervalued.

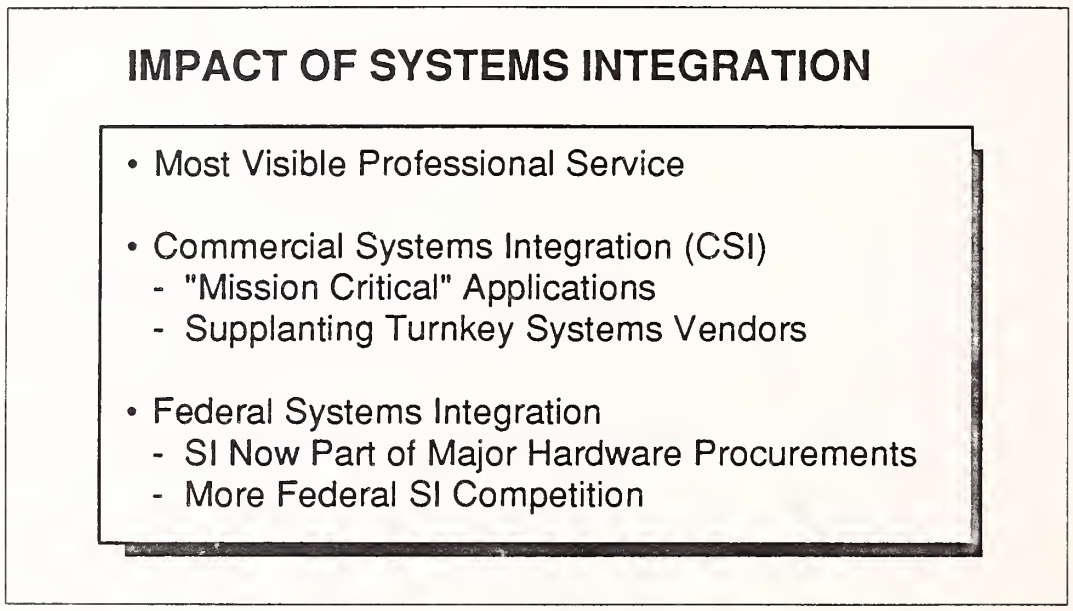
L

Impact of Systems Integration

As indicated in Exhibit III-14, systems integration is the most visible professional service due to the:

- Scope and duration of the projects
- Dollar value of projects, typically exceeding $2 million
- Customer base, generally Fortune 500 manufacturers and Fortune 50 service firms

EXHIBIT III-14



Since they are aimed at "mission critical" applications, commercial systems integration projects represent major undertakings by users. As a result of this focus, INPUT expects systems integration firms to supplant turnkey systems vendors, who generally have expertise in, at most, three computer system architectures and systems software.

Over the past two years, systems integration has become a high-growth market in the federal sector. Federal systems integration (SI) will continue to grow rapidly since more specifications for major hardware purchases are including systems integration services.

Since systems integration started with the federal government, vendors offering such services are international in scope, well-financed, have extensive in-house training capabilities, and enjoy numerous marketing alliances. Boeing Computer Services, Lockheed Missiles and Space Corp., Martin Marietta Corp., and Grumman Corporation compete aggressively for their respective federal SI project wins. As more hardware bids include SI requirements, IBM, Unisys, and Digital Equipment will supplant "traditional" federal SI vendors, which will likely attack the commercial base of hardware, software, and professional services vendors.

M

New Players—Temporary Personnel Agencies

Three facts establish the case for a shortage of qualified IS personnel, a key driving force in professional services, identified in Exhibit III-15.

(1) There are insufficient qualified IS personnel to meet the growing demand from manufacturing and service organizations.

(2) As a result of the 1960s "baby bust," demographics indicate a shortage of U.S. workers in the 21-30 year range.

(3) Sufficient numbers of employees do not want to work the traditional "9 to 5" job on a year-round basis.

EXHIBIT III-15

GROWING ROLE OF TEMPORARY PERSONNEL AGENCIES

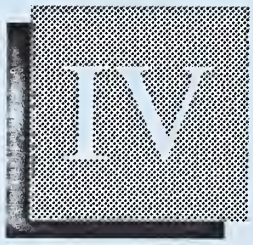
- Driving Force: Shortages of Qualified IS Personnel
- Temporary Firms offer Short-Term Solutions
- Economics of Temporary Personnel Agencies
  - Low Cost of Entry
  - Limited Added Value Services

One short-term solution involves temporary personnel agencies placing qualified IS personnel at client companies for extended periods. This solution permits:

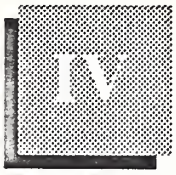
- Effective use of the workers wanting to work part-time
- Access to workers with specialized, versus generalized, knowledge
- Formation of an informal coalition of independent contractors, who benefit from reduced marketing expense

Firms such as U.K.-based Blue Arrow plc, which acquired Manpower, and Menlo Park, CA-based Adia Services place temporary information services workers.

Key characteristics of temporary personnel agencies include low cost of entry and limited added value for its services. As a result, successful agencies will differentiate by concentrating on "renting" persons with specific expertise. Such expertise could include operating systems, data base management software, or communications via local-area networks.



Markets



Markets

A Industry Structure

Before discussing the structure of the professional services market, it is appropriate to first discuss the structure of the overall information services (IS) industry. INPUT segments the U.S.-based IS industry into seven delivery modes serving 15 industry-specific sectors and seven cross-industry sectors. INPUT's seven IS delivery modes include:

- Processing services
- Network services
- Turnkey systems
- Software products
- Systems integration
- Professional services
- Computer system support services

Please refer to Exhibit I-1 to review the role of professional services in the context of the IS industry.

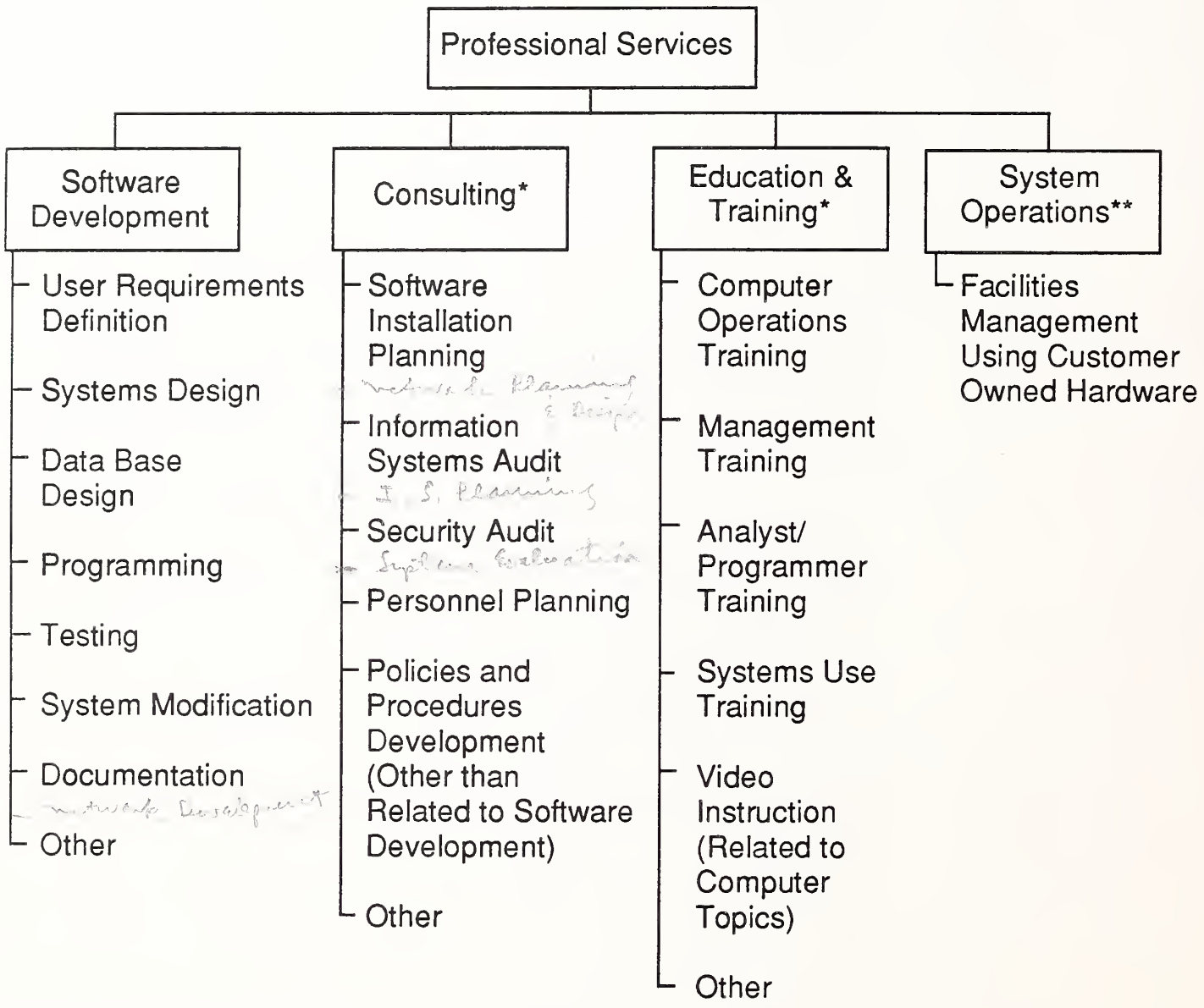
INPUT divides the professional services market into four segments, shown in Exhibit IV-1:

- Software development
- Consulting
- Education and training
- System operations (previously called "facilities management")

The above categories represent types of services offered in support of the information services industry rather than generic services. For example, "education and training" includes services such as computer operations training, management training, and video instruction related to computer use. In a like manner, "consulting" services are specific to the IS needs of customers.

EXHIBIT IV-1

PROFESSIONAL SERVICES MARKET STRUCTURE



*Related to computer systems, topics, or issues
**Formerly "Professional Services Facilities Management"

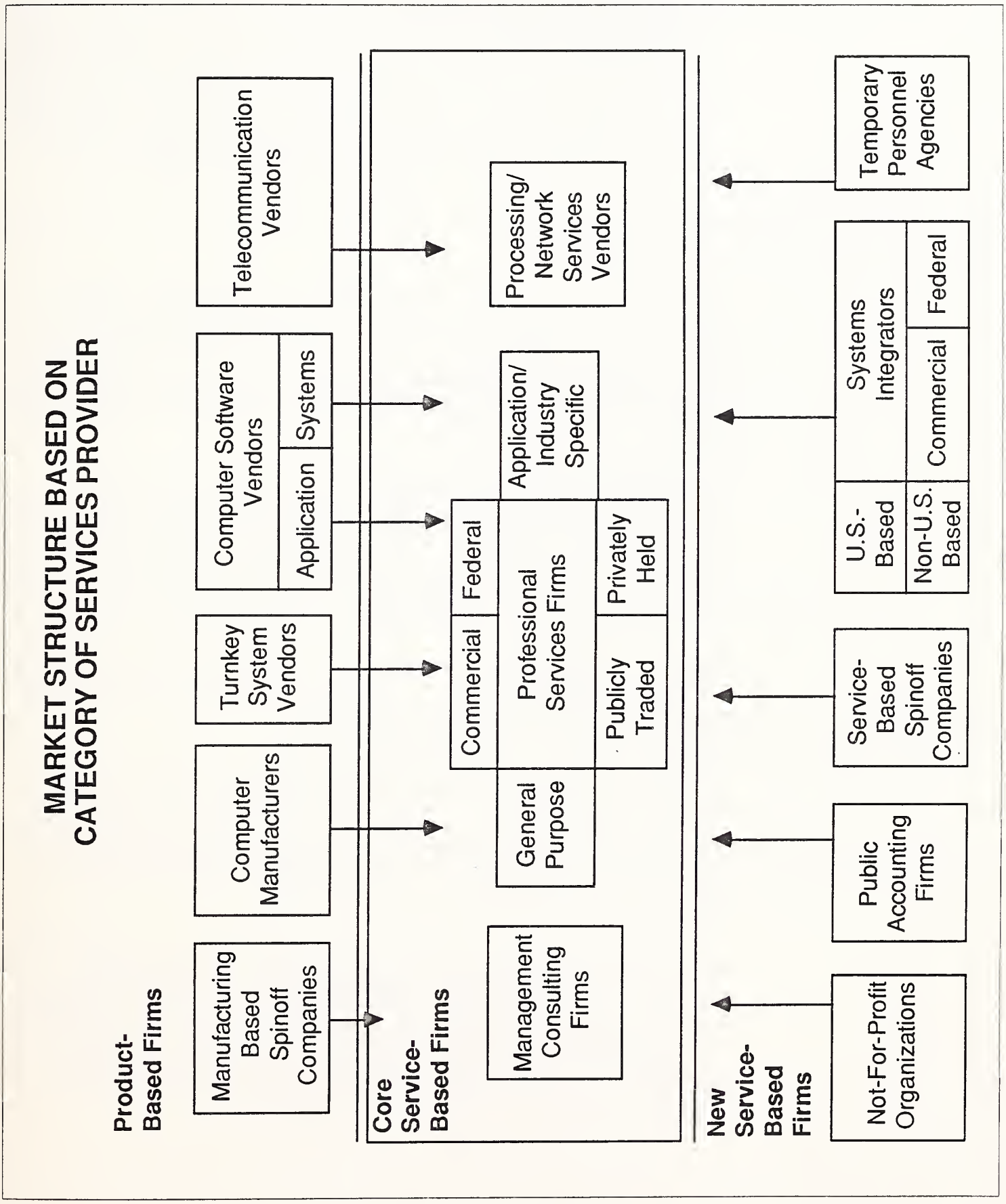
B

Market Structure

Exhibit IV-2 presents the structure of the professional services market based on the category of service provider. The structure places professional services firms into one of three categories:

- Product-based
- Core service-based
- New service-based

EXHIBIT IV-2



"Core service-based" firms are the industry pioneers—some having offered professional services since the late-1950s. Although public accounting firm Arthur Andersen & Company has been a key player in professional services since the mid-1950s, the "new service-based" firms did not generally enter the professional services market until the 1960s or 1970s. Product-based firms, which sell primarily computer hardware or other products, entered the professional services market in various years between 1965 and 1984. IBM, with its emphasis on customer service and support, helped build the market for professional services.

C

Professional Services Market

1. Market Overview

The professional services market continues to grow from a 1987 user expenditure level of $12.71 billion to a 1988 level of $15.07 billion, representing a compound annual growth rate (CAGR) of 18%. Over the five-year forecast period shown in Exhibit IV-3, professional services will grow at a 17% CAGR, reaching user expenditures of $33.5 billion in 1993.

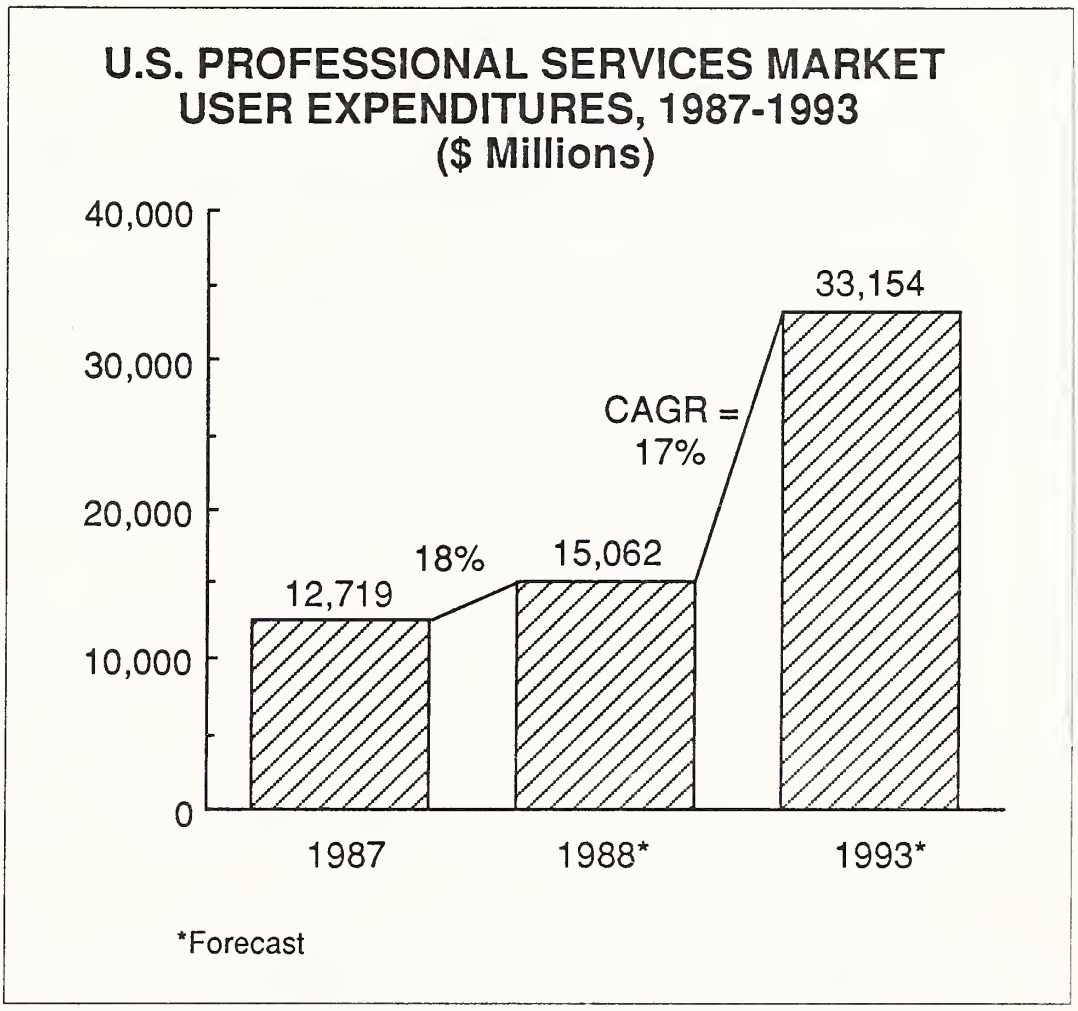
The continued solid growth in professional services results from the continued pressure on users to maintain and enhance application systems necessary to be competitive in a given industry. Such applications are often called "mission critical," since they represent the heart of a company's operations. As such, they require experienced and skilled personnel, which may not be available inside the organization when needed.

Professional services vendors also bring a unique perspective to problem solving. As a result of their independence, vendors can provide alternative solutions to industry-specific problems.

Professional services consulting helps users select from the myriad of applications software or turnkey systems available to satisfy the user's needs. Professional services firms attempt to make impartial recommendations in the selection process. By contrast, a consultant from a software products company offering a certain type of software solution will try to promote that product.

As systems become more complex, users hire professional services firms based on their experience in customizing or developing application systems. Their ability to perform specialized, one-time services, such as a particular application module or software conversion from one hardware platform to another, represents substantial added value. The use of an outside service makes it necessary to hire staff that is needed for a limited time frame.

EXHIBIT IV-3



2. User Expenditures by Industry

In 1988, users spent about $15.1 billion for professional services, spread across 14 industry sectors. These expenditures by industry, shown in Exhibit IV-4, range from a high of $3 billion to a low of about $60 million.

Spending in 1988 for professional services by the five leading industries accounted for 75% of total user expenditures. The top five industries are, in order:

- Discrete manufacturing
- Federal government
- State and local government
- Banking and finance
- Process manufacturing

EXHIBIT IV-4

PROFESSIONAL SERVICES USER EXPENDITURES BY INDUSTRY, 1988-1993

Industry Sector	User Expenditures ($ Millions)		1988-1993 CAGR (Percent)
	1988	1993	
Discrete Manufacturing	3,122	7,431	19
Process Manufacturing	1,491	4,029	22
Transportation	166	363	17
Utilities	423	740	12
Telecommunications	679	1,455	16
Distribution	461	1,042	18
Banking & Finance	4,907	4,165	17
Insurance	1,204	2,630	17
Medical	299	682	18
Education	59	130	17
Services	117	256	17
Federal Government	2,908	5,004	11
State & Local Government	1,937	4,610	19
Other Industry-Specific	288	617	16
Total	15,062	33,154	17

Factors contributing to spending levels in the key industries are discussed below.

Discrete manufacturers are spending heavily to automate the factory floor and the materials management/distribution functions, with the heaviest expenditures for software development.

The federal government has awarded multi-billion dollar contracts to replace second-generation computer systems in accounting and finance, logistics, and personnel. As a result, numerous programs must be recompiled or rewritten to effectively operate on the new processors. In addition, consulting expenditures have increased as a result of developing plans to integrate future hardware and software products with existing systems.

Like the federal government, state and local governments are upgrading mainframe-based systems for accounting, revenue collection, and health and human services applications. Professional services firms will be hired to perform extensive software consulting to protect the investment in existing application software. Since state and local governments must operate on a pay-as-you-go basis, these organizations are major users of "systems operations" contracts.

Deregulation and internationalization in the banking and finance markets have created sizeable opportunities for professional services firms offering software development, consulting, and systems operations. Use of all professional services, except education and training, is most balanced in this industry sector.

Process manufacturing, driven by the need to reduce costs, is re-automating its production processes. Process manufacturing companies are also modifying their information systems to yield more customer and marketing data. Lastly, IS upgrades are necessitating extensive investments in skills upgrades for its professional staff. Professional services expenditures in process manufacturing include software development, education and training, and consulting.

3. User Expenditures by Functional Area

In 1987, users' professional services expenditures were concentrated in four functional areas:

- Manufacturing/business operations
- Accounting/administration (including "office systems")
- Data processing/telecommunications
- Logistics/physical distribution

As shown in Exhibit IV-5, user expenditures for professional services in manufacturing and accounting represent more than 50% of the 1987 total.

EXHIBIT IV-5

PROFESSIONAL SERVICES USER EXPENDITURES BY FUNCTIONAL AREA, 1987

Functional Area	User Expenditures ($ Millions)	Percent of Total Market
Manufacturing/Business Operations	3,819	30
Accounting/Administration*	2,913	23
Data Processing/ Telecommunications	2,149	17
Logistics/Distribution	1,513	12
Research & Development	1,001	8
Sales & Marketing	637	5
Other	502	4
Human Resources	185	1
Total	12,719	100

*Includes "office systems"

The manufacturing and operations area encompasses diverse professional services activities such as upgrading systems for computer-integrated manufacturing, airline reservations, railroad management, and hospital/ laboratory management.

Expenditures in accounting and administration are spurred by the relatively rapid implementation of electronic data interchange (EDI) services. INPUT segments EDI-related professional services into two categories:

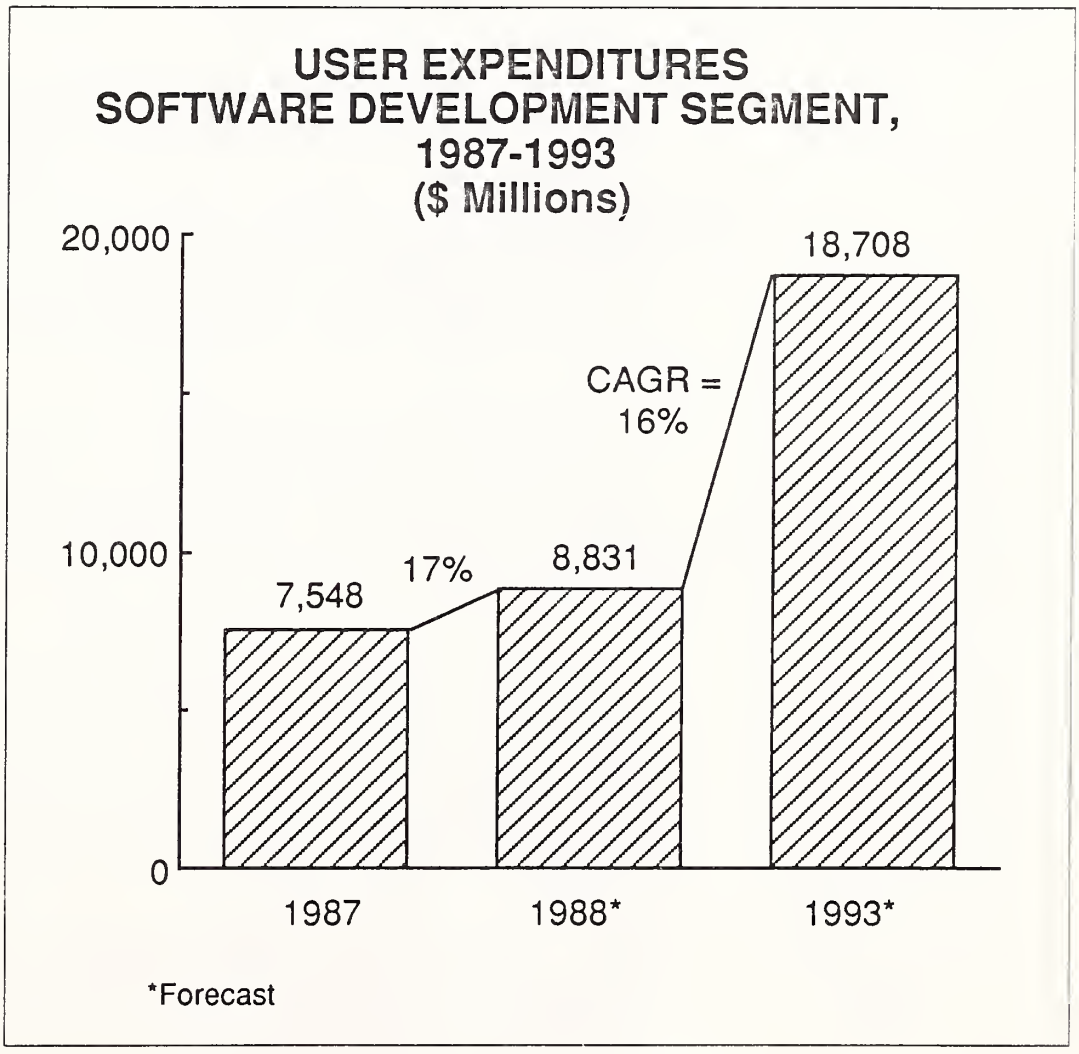
- Front-end
- Back-end

Front-end EDI professional services include the consulting and software modification necessary to implement EDI services. Back-end EDI professional services, chiefly software modification, result from the need to modify existing, or to purchase and modify, new accounting and finance software in order to fully utilize EDI capabilities.

4. Software Development Segment

Software development with user expenditures in 1987 of more than $7.5 billion, the largest of the four professional services submodes, is expected to grow 17% in 1988 to $8.8 billion (shown in Exhibit IV-6).

EXHIBIT IV-6



INPUT's definition of "software development" includes these services:

- User requirements definition
- Systems design
- Data base design

- Programming
- Testing
- System modification
- Documentation

In general, software development is driven by new hardware technologies, new generations of software products, and increasing purchases of computers by organizations of all sizes.

Hardware vendors' introductions of new central processors mean more business for professional services firms. The recent round of product introductions (IBM's AS/400, DEC's VAXcluster, Unisys and Honeywell mainframes, more single- and multi-user microcomputers) will lead to more software conversion business as users add new applications or modify existing software.

Vendors continue to aggressively develop and sell new products although users have not fully realized the benefits of relatively stable technologies such as higher density disk and tape storage drives, relational data base management software, and 4GLS. New optical disks, optical scanners, integrated voice/data products, and computer-assisted software engineering (CASE) packages, while useful technologies, have greatly speeded up the perception that users must pay for exotic products in order to "gain a competitive advantage."

Small businesses converting from manual methods or timesharing to in-house microcomputers or minicomputers also require extensive software development. While small businesses need setup and customization of their newly-purchased software, future enhancements and modifications to installed application software are professional services.

Packaged software modification is rapidly overtaking custom software development. By listening to what their customers need, software vendors have indirectly contributed to the boom in software development. To their credit, mainframe, minicomputer, and microcomputer software vendors now offer much more functionality for a wider range of customers than ever. As a result, users can buy 80% of required functionality rather than developing the software in-house.

The vertical sectors most heavily utilizing software development services include banking and finance, insurance, and manufacturing. Within manufacturing, industrial automation and material handling applications are receiving increased attention.

More international business for U.S. manufacturing companies and services vendors means adding specific software features such as handling exchange rates and different currency denominations for purchases and sales. The international aspect, though, provides significant opportunity for software development and consulting.

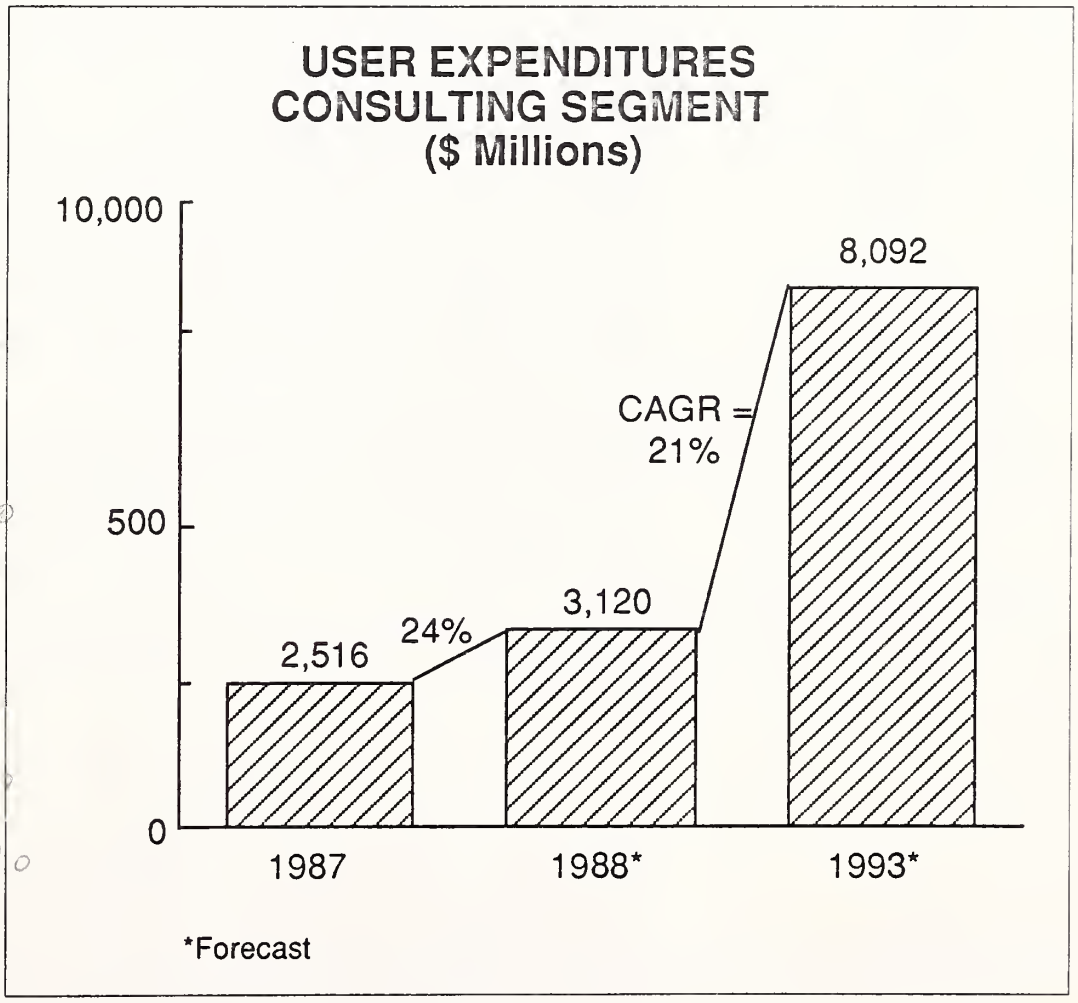
An additional driving force for software development is the so-called trend toward standards. Despite the promulgation of numerous sets of "standards," no "true standards" exist. Hardware and software vendors embed proprietary "hooks" in their products at levels that require sophisticated knowledge. Custom software development expertise is needed to overcome the shortcomings of commercial off-the-shelf products.

Finally, large organizations, the primary users of software development, are looking to improve the return on their expenditures with professional services vendors. Specifically, sophisticated users want software developed faster with better control of costs.

5. Consulting Segment

The consulting segment with 1987 user expenditures of $2.5 billion is expected to grow 24% in 1988 to $3.1 billion. This growth plus the forecast through 1993 is depicted in Exhibit IV-7.

EXHIBIT IV-7



According to INPUT's definition, the consulting segment of professional services includes:

- Software installation planning
- Information systems auditing
- Security auditing
- Personnel planning
- Policies and procedures development

In order to get a better understanding of the consulting segment, INPUT evaluated the use of such services by three categories:

- Processing and network services
- Software
- Information services (IS) management

Consulting in support of network management services is *hot*! The proliferation of LANs, WANs, micro-to-mainframe links, electronic data interchange (EDI), and ISDN have created strong demand for knowledgeable persons in network management.

Software is a broader category, encompassing system and application software. The demand for system software (and some application software) consulting is driven partially by the shift from mainframes to minicomputers and microcomputers. Consulting in the application software area really translates to "application software maintenance." Users everywhere are searching for the "universal" solution to easier application software maintenance. Through consulting services, users are better able to select and utilize existing application generation programs. While these programs do not solve all problems, they represent an immediate step in the right direction.

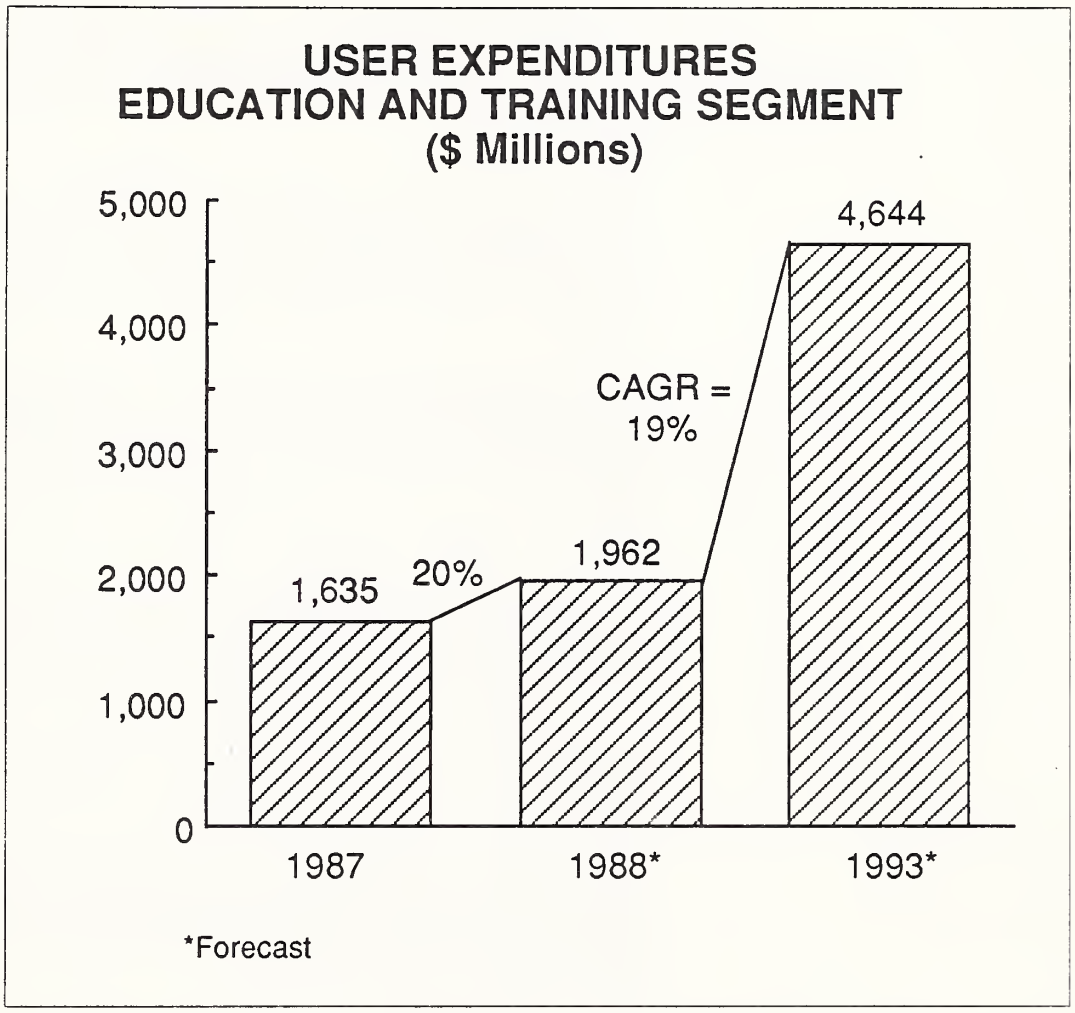
The new consulting services buzzword, "IS Change Management," describes the process of moving IS from a centralized, impersonal organization to one with more focus on computing end users. This new focus includes increased user support and training.

Vertical sectors with the greatest need for consulting services are the Federal government, discrete manufacturing, transportation, and insurance.

6. Education and Training Segment

Education and training, at $1.6 billion or about 13% of total 1987 user expenditures, is the smallest segment in the professional services delivery mode. This number, depicted graphically in Exhibit IV-8, represents only external user expenditures for such services; monies spent for internal training are not reflected in the figures.

EXHIBIT IV-8



The importance of education and training far exceeds its position based on user expenditures relative to consulting, software development, or systems operations. Rather, it is the foundation upon which IS vendors and large commercial, government, and services customers base their expertise.

As this segment matures, services are becoming increasingly specialized. Specifically, education and training covers the following types of services:

- Systems software
- Hardware platforms
- Technology
- IS management

Education and training for systems software products covers recently introduced packages such as IDMS, and IBM's DB2 and DEC's rdb data base management systems.

The introduction of new hardware platforms forces users and software developers to learn the technical ins and outs of these products. Digital

Equipment's introduction a couple years ago of its MicroVAX line of workstations and IBM's recent introduction of the AS/400 midrange system automatically require training and education for users and developers.

IS managers and non-IS managers need high-level information on emerging technologies, chiefly robotics, industrial automation, AI, LANs, telecommunications, data communications, and voice/data integration.

IS managers require exposure to new methodologies for running the IS department. Education and training is required in to keep up with changes in project management and software development methodologies.

No longer are separate formal training classes offered to users and vendors. Now, employees from client companies can take classes formerly offered only to members of the vendor technical staff. INPUT market data reflects user expenditures for such classes.

7. System Operations (formerly "Facilities Management") Segment

For vendors offering more than one professional service, system operations, with the smallest user expenditures, is the least important segment. Please refer to Exhibit IV-9 for a graphic representation of user expenditures in 1987, 1988 and 1993.

This service, that of operating data processing centers for a fixed fee, continues to have a relatively narrow appeal.

The industry sectors most heavily using systems operations services include, in order:

- Federal government
- State and local government
- Manufacturing
- Banking and finance

8. Current Market Situation

The rapid maturation of the professional services market has led to:

- New market segmentation by users
- Differentiation of vendor services using proprietary products
- Narrowing of specialized alliances between hardware vendors and professional services firms

EXHIBIT IV-9

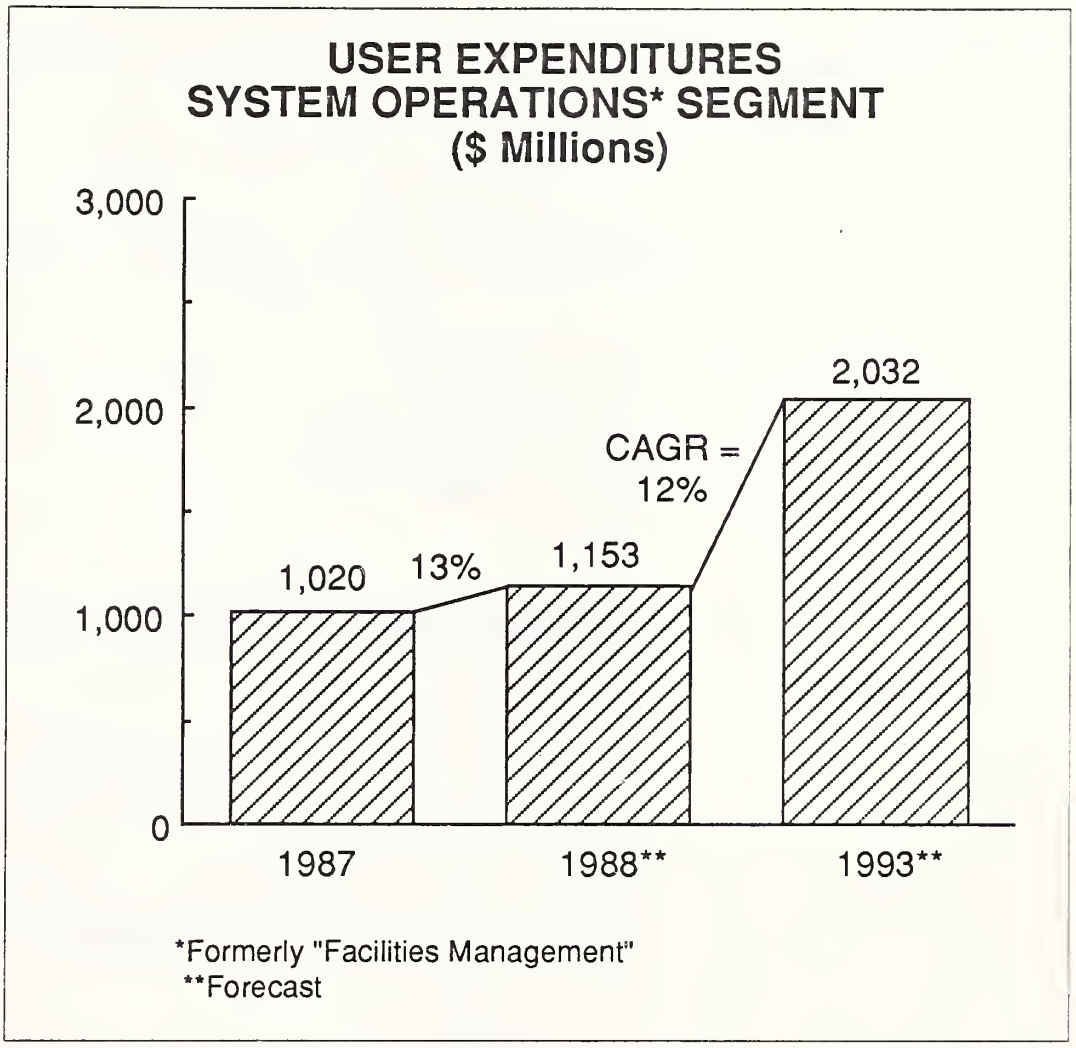
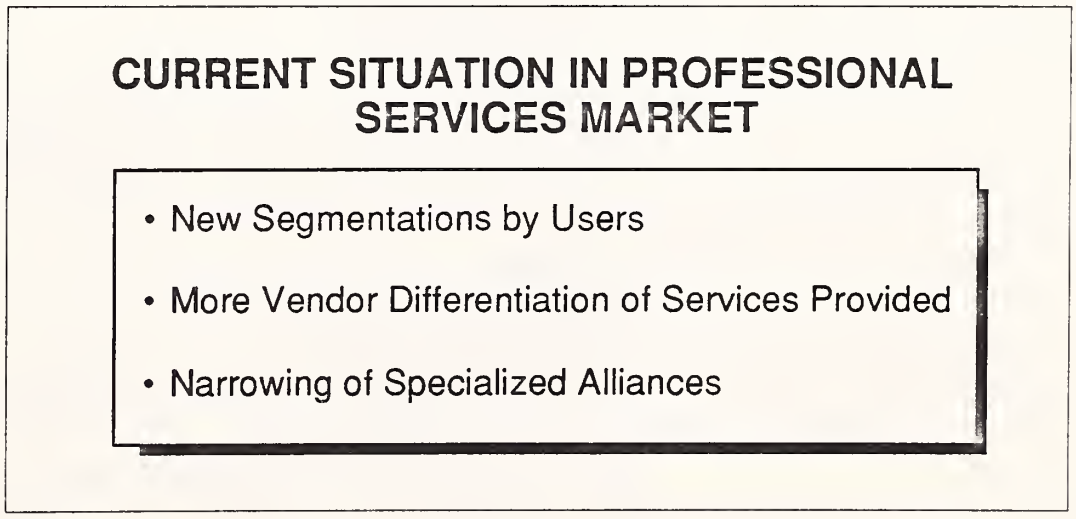


Exhibit IV-10 summarizes, in words, the current situation in the professional services market. Segmenting the market is one way to evaluate professional services activities. While the professional services market can be segmented on the bases of category of service provider and vendor capabilities, INPUT has identified three new user-based market segmentations.

EXHIBIT IV-10



First, user firms are segmenting the market based on the size of the professional services firm. The largest manufacturing, financial services, transportation, or utility organizations require the largest professional services firms. These firms' expertise, international experience, proprietary products, project management skills and, most importantly, solid financial positions ensure they will receive at least a Request for Proposal (RFP) to bid on the project.

Second, users divide the professional services market into vendors with unique capabilities and those offering "plain vanilla" services. Vendors have developed proprietary software in computer-aided software engineering (CASE) and project management as the basis for differentiation and maintain this differentiation by not selling their products directly to users.

Third, a key characteristic of the professional services business is the flexible relationships between hardware vendors and vendors providing mainly services. In this market segment, hardware vendors team with professional services vendors for one project, then compete vigorously with one another for a different project. In the next two or three years, professional services vendors will form stronger alliances with specific hardware vendors. This new marketing approach will result from the increasing level of specialized knowledge required and smaller services vendors' inability to make the substantial investment needed to train an internal staff on multiple hardware and system software products.

9. Commercial Professional Services Market

INPUT defines the professional services market to include these elements:

- Software development
- Consulting
- Education and training
- System operations
- Systems integration

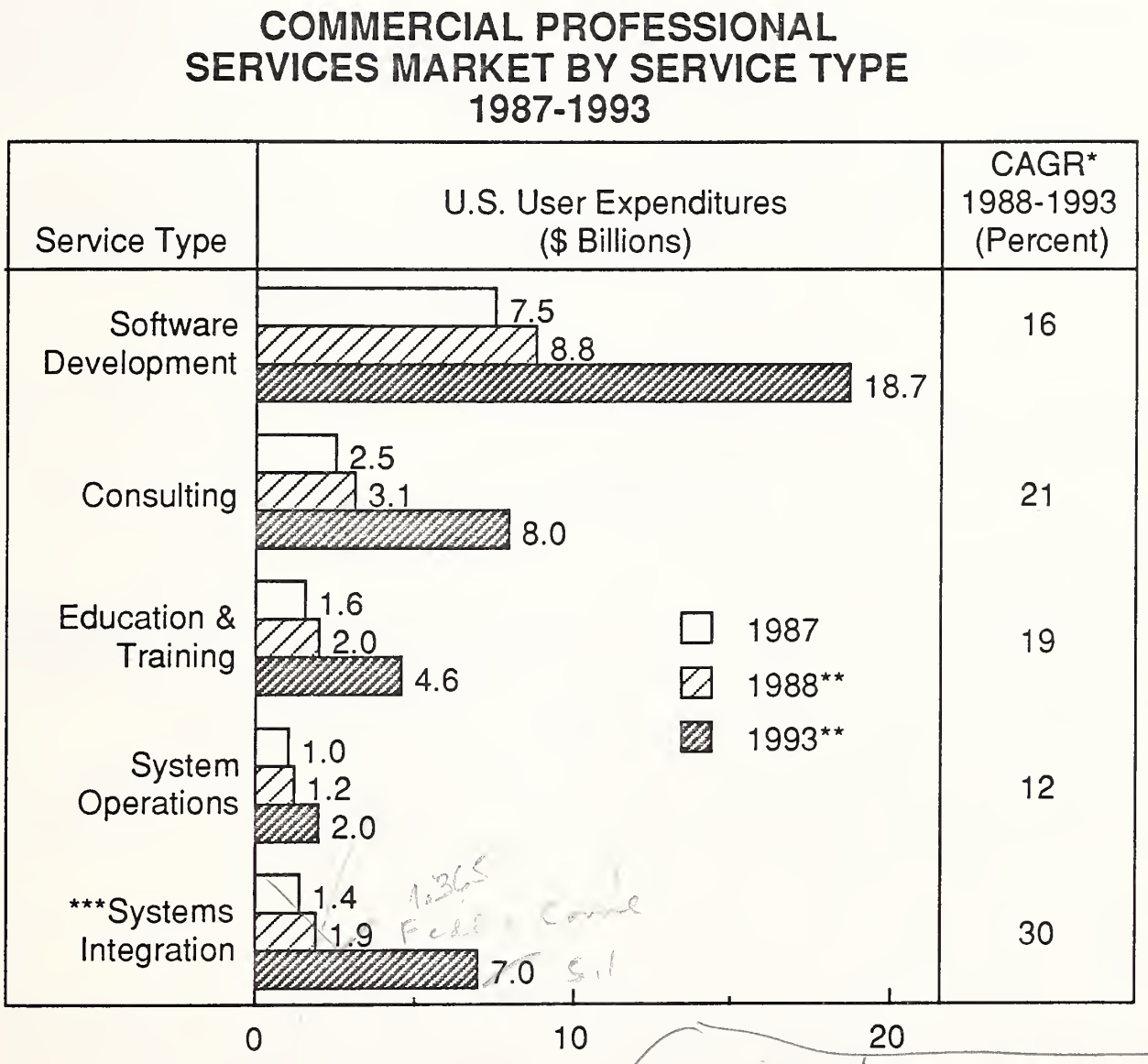
The first four segments were discussed previously. The "systems integration" identified here is limited to the professional services portion of systems integration (SI) projects, and includes:

- Consulting
- Education and training
- Software development
- (Systems integration related) Systems operations

Within the systems integration delivery mode, users spend the most on software development followed by, in order, consulting, education and training, and systems operations.

Exhibit IV-11 illustrates the growth in professional services expenditures by segment for 1987 and the forecast expenditures for 1988 and 1993.

EXHIBIT IV-11



10. Federal Professional Services Market

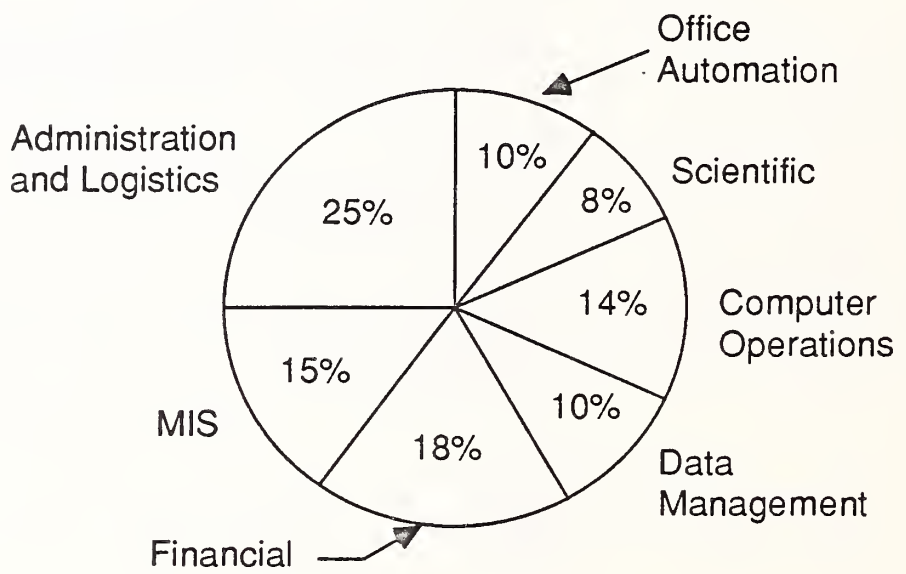
Through its Vienna, Virginia-based Federal Information Systems Program, INPUT tracks expenditures for information services by the Federal government. Federal government expenditures are divided into two main categories:

- Civil agencies
- Department of Defense (DoD) agencies

Based on data for Government Fiscal Year (GFY) 1988, civil agencies spend most heavily on professional services for traditional areas such as administration and logistics (25%), followed by financial (18%), and MIS (15%). As shown in Exhibit IV-12, expenditures for professional services for office automation and data management each represent 10% of total civil agency expenditures.

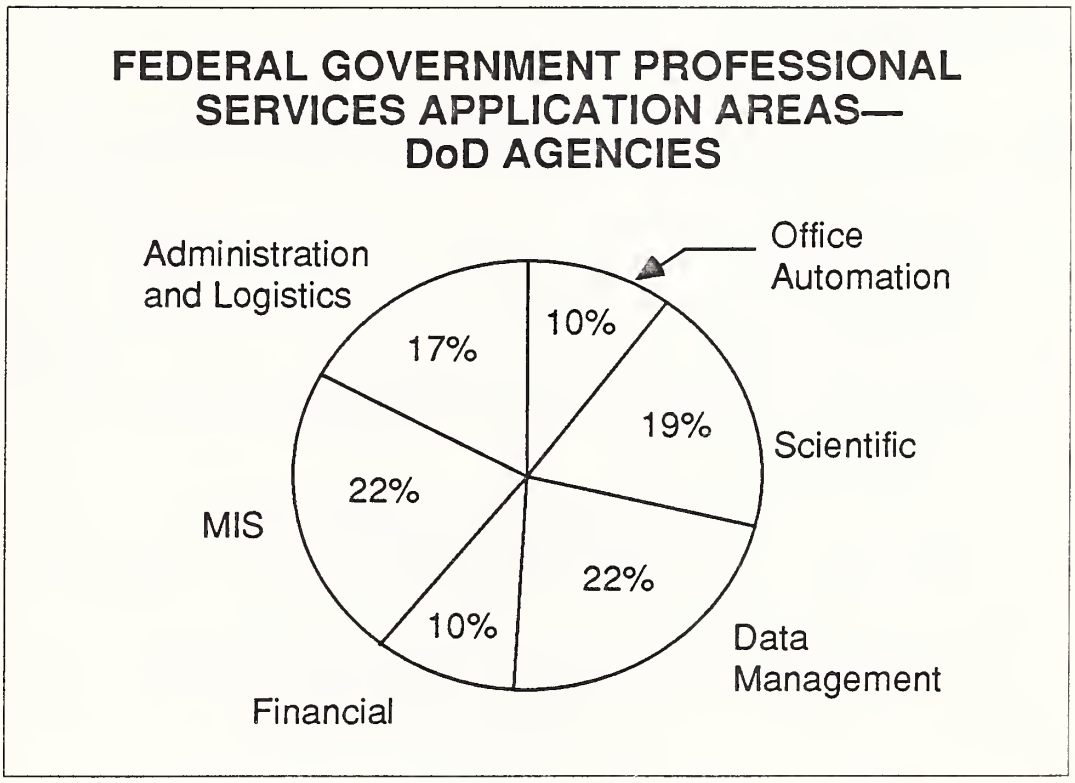
EXHIBIT IV-12

FEDERAL GOVERNMENT PROFESSIONAL SERVICES APPLICATION AREAS— CIVIL AGENCIES



MIS and data management each consume 22% of DoD agency expenditures for professional services. As indicated in Exhibit IV-13, DoD professional services expenditures for scientific and administration and logistics applications closely trail those for MIS and data management.

EXHIBIT IV-13



D

Market Share by Vendor

1. Market Share by Category of Vendor, 1987

A different way to evaluate the professional services market is on the basis of market share held by the various categories of service providers. To segment the professional services market, vendor information contained in INPUT's proprietary data base was placed in one of 11 categories. INPUT's findings are presented in Exhibit IV-14.

The top two groups, computer manufacturers and government-oriented professional services vendors, had shares of 22% and 21%, respectively. This result is consistent with INPUT's expectations since these classes of vendors long ago entered the professional services business. What is surprising is the 12% share held by public accounting firms that, excluding Arthur Andersen & Company, offered these services only within the last five to ten years.

The top four categories—computer manufacturers, government-oriented professional services vendors, privately-held professional services vendors, and public accounting firms—together garnered 72% of total 1987 user expenditures.

EXHIBIT IV-14

U.S. PROFESSIONAL SERVICE MARKET MARKET SHARE BY VENDOR CATEGORY 1987

Vendor Category	User Expenditures ($ Millions)	Market Share (Percent)
Computer Manufacturers	2,806	22
Government-Oriented Professional Services (Publicly Held)	2,671	21
Privately Held Professional Services (Federal and Commercial)	2,161	17
Public Accounting	1,525	12
"Spinoffs" (From Manufacturing Companies	1,144	9
Commercial-oriented Professional Services (Publicly Held)	889	7
Management Consultants	508	4
Software Products	404	3
Processing/Network Services	359	3
"Not -for-Profit"	140	1
Turnkey Systems	112	1
Total	12,719	100

2. Comparison of Market Share by Category of Vendor, 1985 and 1987

Given the growing industry trade press coverage of professional services, it is tempting to believe the structure of the market has changed dramatically during the past couple years. INPUT calculated the 1985 market shares held within each of the same 11 vendor categories, comparing those findings with the 1987 data, with the results shown in Exhibit IV-15. Despite all the promotional hoopla, market shares held by each vendor category did not change much between 1985 and 1987. Nearly all the changes in market share occurred in the top five categories and for no category did its market share change by more than two percentage points.

INPUT believes this relative market stability is the result of aggressive marketing tactics by the leading vendors. Such tactics have included joint marketing agreements, seminars, demonstration centers, referrals from satisfied customers, and the formation of flexible alliances. Hardware vendors have benefitted from implementing incentive-based compensation for their customer support personnel who frequently visit user sites.

3. Market Share of Top 10 Vendors, 1984 through 1987

The market share of the top ten combined commercial/federal professional services vendors between 1984 and 1987 is highlighted in Exhibit IV-16. Overall, the larger firms continue to increase their combined share of the professional services market at 6-7% per year.

This phenomenon can be attributed to more aggressive actions by the leading vendors. Such actions, which have been mainly marketing oriented, include:

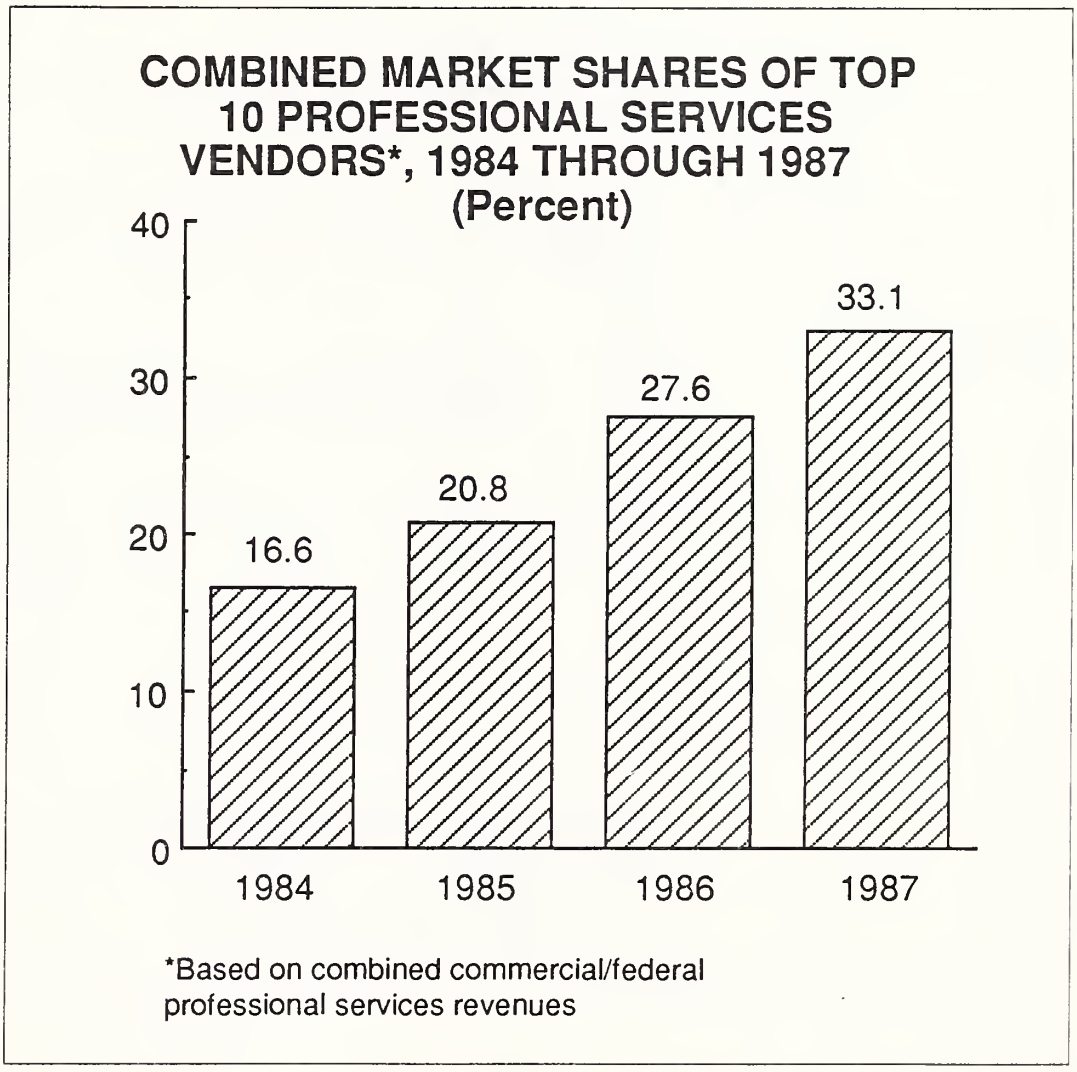
- Vendor referral programs
- Joint ventures
- Focus on front-end consulting
- Maintain vertical market focus
- Focus on certain technologies
- Focus on international opportunities

EXHIBIT IV-15

COMPARISON OF MARKET SHARE BY VENDOR CATEGORY 1985 AND 1987

Vendor Category	1985 Market Share (Percent)	1987 Market Share (Percent)	1987 vs. 1985 Difference (Percent)
Computer Manufacturers	20	21	+1
Government-oriented Professional Services (Publicly Held)	19	21	+2
Government and Commercial Professional Services (Privately Held)	19	17	-2
Tax/Auditing	11	12	+1
"Spinoffs" (From Manufacturing Companies	9	8	-1
Commercial-oriented Professional Services (Publicly Held)	5	5	0
"Not-for-Profit"	5	5	0
Management Consultants	4	4	0
Software Products	3	3	0
Processing/Network Services	3	3	0
Turnkey Systems	2	1	-1
Total	100	100	

EXHIBIT IV-16



E

Overlap with Data in INPUT *Customer Service Program*

INPUT's *Customer Service Program* tracks activities in computer system and software maintenance by hardware vendors and third-party maintenance (TPM) vendors. These professional services activities, while slightly different from the professional services defined in Section C in this chapter, nevertheless represent sizeable expenditures.

Professional services activities perfomed by customer support organizations include, but are not limited to:

- Equipment removal/reinstallation
- Preinstallation planning
  - Environmental
  - Site
  - Installation
- Consulting
  - System performance optimization ("tuning")
  - Network planning and design
  - Network implementation (cabling)

- Maintenance training
- Site management services
  - Coordination for servicing equipment from many vendors

As shown in Exhibit IV-17, users spent about $650 million in 1987, or about 5% of the total, with hardware manufacturers' customer support organization and third-party maintenance vendors for professional services.

EXHIBIT IV-17

PROFESSIONAL SERVICES MARKET OVERLAP WITH CUSTOMER SERVICES

Customer Services 1987 ($ Millions)	Professional Services 1987 ($ Millions)	Percent Overlap
660*	12,719	5.2

*Divided into:
Large Systems: $305 Million
Small Systems: $355 Million

F
U.S. Systems Integration Market

1. Introduction

INPUT's *Systems Integration Program* divides the U.S. systems integration (SI) market into two primary categories:

- Commercial
- Federal

Like the U.S. professional services market, the U.S. systems integration market includes players from diverse vendor categories. To better understand the SI market, Exhibit IV-18 lists a sample of vendors from nine categories.

EXHIBIT IV-18

SYSTEMS INTEGRATION VENDOR CLASSIFICATION

Category	Examples
Hardware Manufacturers	IBM Digital Unisys CDC
Communication/Network Suppliers	RBOCs AT&T
Professional Services	Arthur Anderson, CSC
Custom Software Developers	Systemhouse Computer Task Group
System Operations Vendors	BCS EDS MMDS
Application Software Suppliers	BIS Banking Systems, Inc.
Systems Software Suppliers	Oracle Pansophic
Turnkey Systems Suppliers	CAP Gemini America AGS Computers
Federal Systems Integrators	EDS, CSC American Management Systems

2. Commercial and Federal Systems Integration Markets

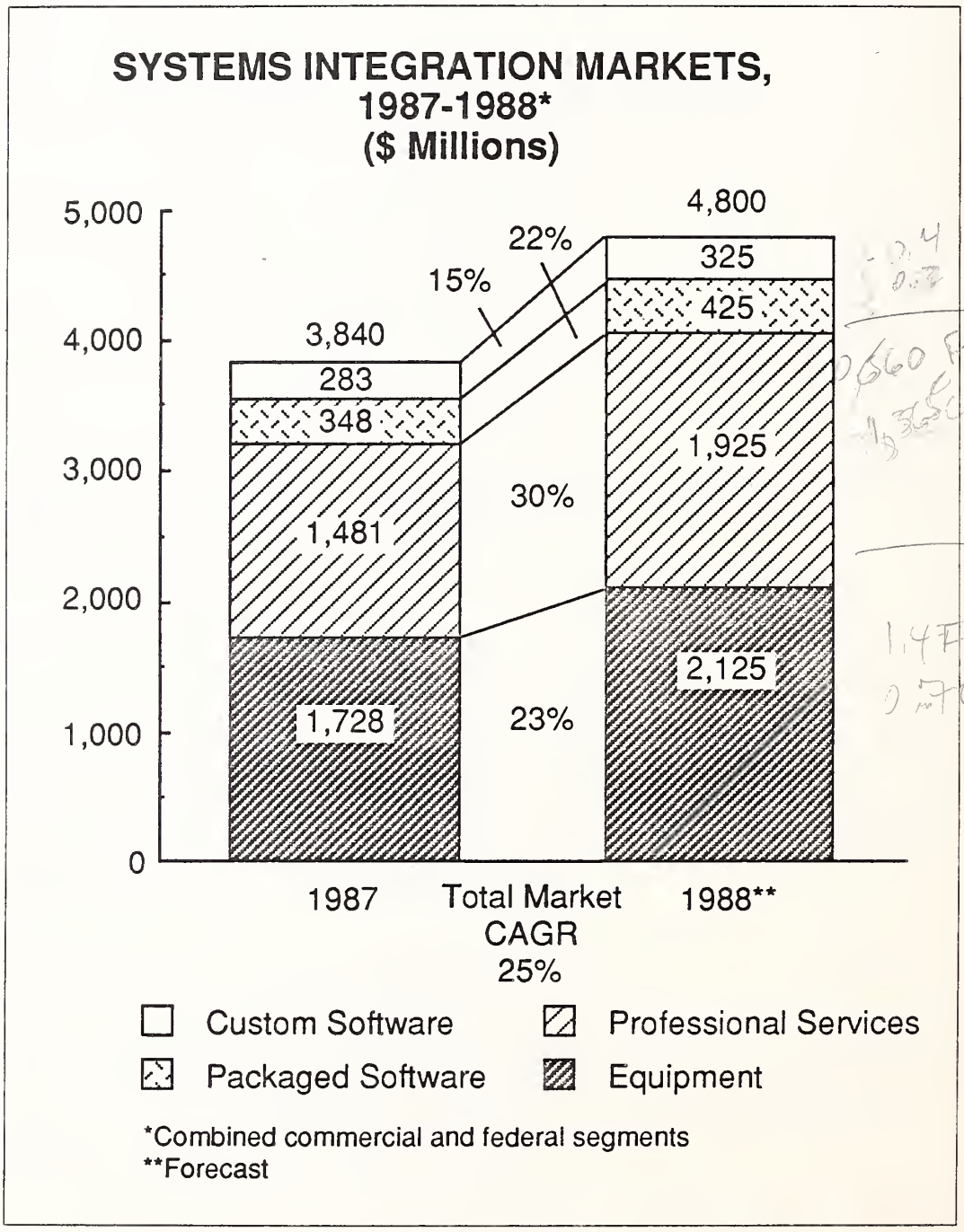
INPUT divides the systems integration market into the following categories that parallel the four key aspects of an SI project:

- Custom software
- Packaged software

- Professional services
- Equipment

Between 1987 and 1988, user expenditures for commercial systems integration (CSI) projects will grow by 25%, reaching $4.8 billion. As indicated in Exhibit IV-19, systems integration-based professional services is the fastest growing segment with a 30% annual growth rate.

EXHIBIT IV-19



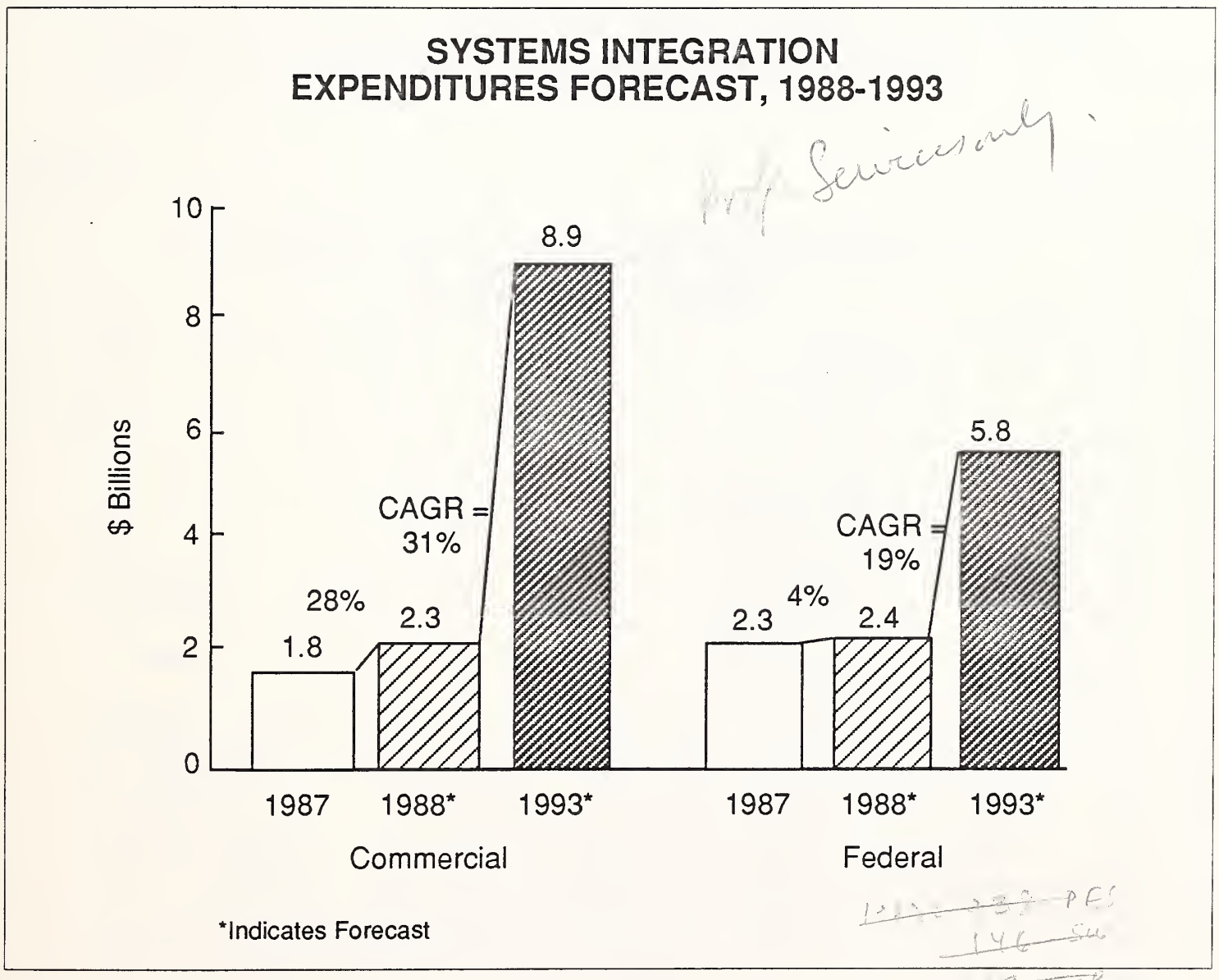
It is logical that expenditures for packaged software and professional services are growing fastest while expenditures for custom software are growing much slower than the overall market. As with other professional services, system integrators are buying more packaged software to

get 80% of the functionality needed at a reasonable price, then modifying the software to meet the customer's needs.

3. Commercial and Federal Systems Integration Market Forecast

While starting from a slightly smaller base, commercial systems integration (CSI) expenditures will grow between 1988 and 1993 at a 31% compound rate, reaching nearly $9.0 billion. As shown in Exhibit IV-20, expenditures for federal systems integration (FSI) will grow at a 19% compound rate to $5.8 billion in 1993.

EXHIBIT IV-20



More systems integration vendors prefer doing commercial projects for these reasons:

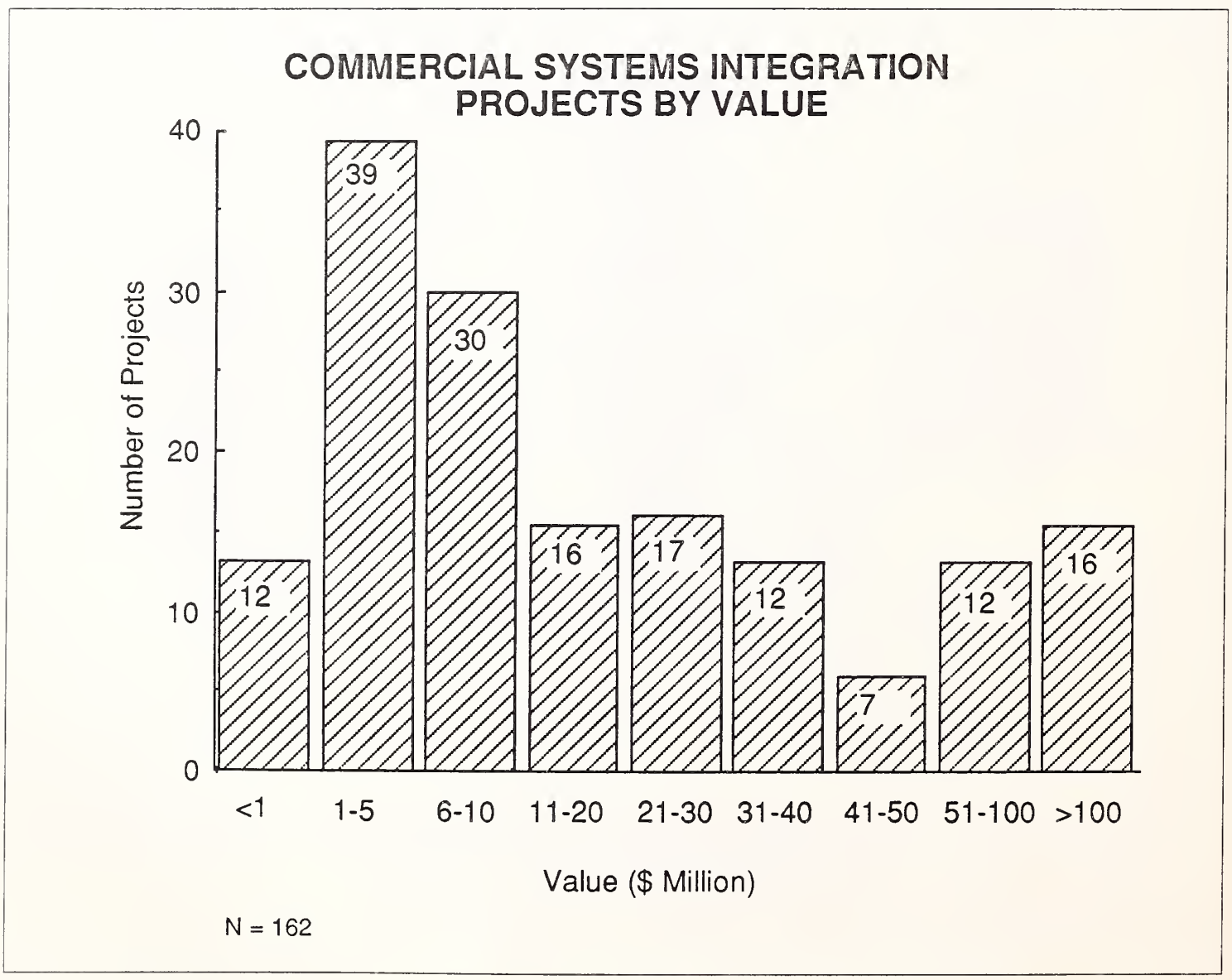
- Shorter sales cycle
- Focused needs
- Less bureaucracy
- Account control aspects
- Follow-on business

4. Commercial Systems Integration Projects

This section, which includes four exhibits, focuses on commercial systems integration projects. The information is excerpted from INPUT's *Systems Integration Program.*

Based on a 1988 INPUT survey, project values range from less than $1 million to greater than $100 million. The largest proportion, 24%, of CSI projects identified were in the $1-5 million range. As shown in Exhibit IV-21, nearly 19% of CSI projects fell in the $6-10 million range.

EXHIBIT IV-21



At this time, most customers are conducting CSI projects with limited dollar value in order to:

- Limit financial risk
- Limit exposure of key aspects of their business
- Learn the process
- Buy time in order to build certain skills in-house

As shown in Exhibits IV-22 and IV-23, the number of commercial and federal systems integration projects underway are about equal at 79 and 82, respectively. Within the commercial market, state and local governments have 21 projects, all valued at less than $100 million, in progress. The second largest area, process manufacturing, has 11 projects, none of which is valued at more than $20 million. Industries with projects in excess of $100 million include the federal government, with 14 such projects, and distribution, with two.

EXHIBIT IV-22

COMMERCIAL SYSTEMS INTEGRATION PROJECTS BY VALUE BY INDUSTRY

Industry	No. of Projects	Contract Value ($M)						
		<1	1-5	6-10	11-20	21-50	51-100	>100
		Number of Projects						
Federal	82		15	15	8	21	9	14
State and Local	21	2	7	3	1	7	1	
Transportation	2	1			1			
Utilities	4		1		2	1		
Discrete Mfg.	8	1	2	2		2	1	
Distribution	8		3		2	1		2
Insurance	6	1	1	3		1		

EXHIBIT IV-23

COMMERCIAL SYSTEMS INTEGRATION PROJECTS BY VALUE BY INDUSTRY

Industry	No. of Projects	Contract Value ($M)						
		<1	1-5	6-10	11-20	21-50	51-100	>100
		Number of Projects						
Banking/Finance	7	2	1	2		2		
Medical	5	4	1					
All Other	4		2	1			1	
Telecomm	3		1	1		1		
Process Mfg.	11	1	5	3	2			
Total Commercial	79	12	24	15	8	15	3	2
Total All Projects	161	12	39	30	16	36	12	16

Nearly 40% of commercial systems integration (CSI) projects focus on industry-specific, rather than cross-industry, applications. As shown in Exhibit IV-24, network applications and operations-related projects, the second and third major applications, represent 27% and 21% of CSI projects identified in INPUT's survey.

5. Federal Systems Integration Market

In government fiscal year (GFY) 1988, the civilian sector of the federal government spent 40% more than the Department of Defense (DoD). In addition, expenditures by the civilian sector will grow faster with the 1993 result of the civilian sector being nearly 50% larger than DoD. Please refer to Exhibit IV-25.

EXHIBIT IV-24

COMMERCIAL SYSTEMS INTEGRATION MARKET BY APPLICATION, 1987

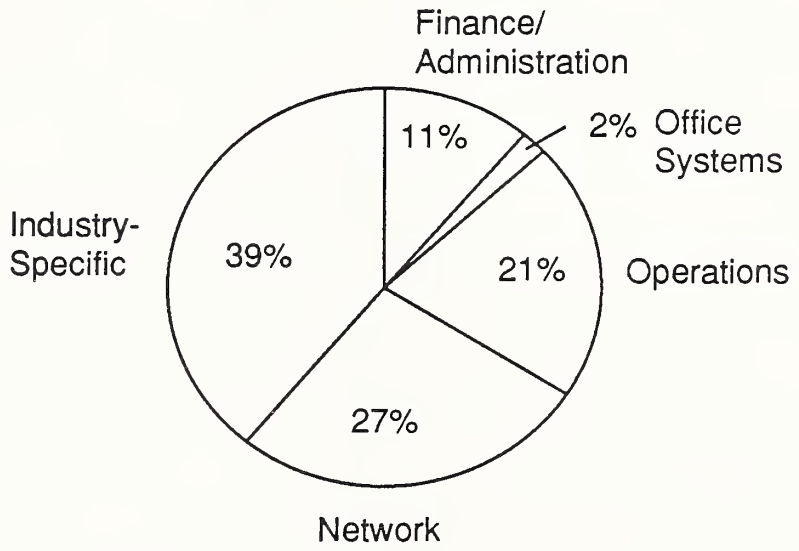


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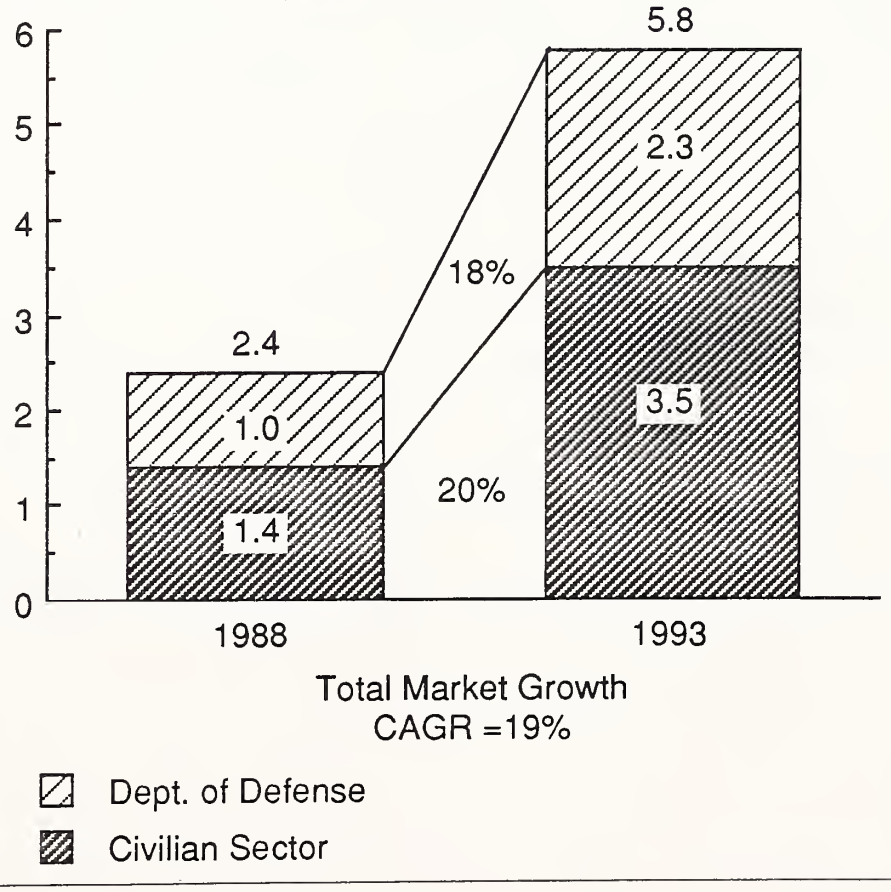
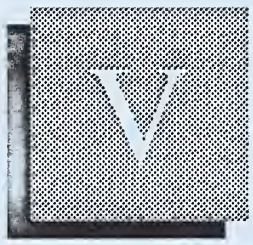
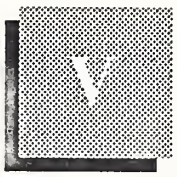
EXHIBIT IV-25

CIVILIAN VERSUS DOD EXPENDITURES FOR FEDERAL SYSTEMS INTEGRATION, 1988-1993 ($ Millions)





Competition



Competition

A

Leading Professional Services Vendors

1. Introduction

INPUT identified leading vendors in the U.S. professional services market and various market segments. "Professional services", defined as those information services-related services performed for customers, include:

- Software development
- Consulting
- Education and training
- Systems operations (formerly "facilities management")

To ensure common understanding, this report reviews the definition of the components in each market segment.

"Software development," the broadest market segment, includes the following services: user requirements definition, systems design, data base design, programming, testing and debugging, system modification, and documentation.

"Consulting" includes these services: software installation planning, information systems audit, (computer system) security audit, information services (IS) personnel planning, and policies and procedures development.

Information systems-related "education and training" comprises: computer operations training, IS management training, analyst/programmer training, systems use training, and video instruction.

"Professional services" has three component parts:

- The services portion of systems integration, distinct from the hardware, packaged software, and communications aspects

- The separate professional services delivery mode described above (which includes software development, consulting, education and training, and system operations). The primary focus of this report is professional services as a delivery mode.

- Professional services offered as support services directly by hardware vendors and are tracked by INPUT's *Customer Services Program.*

2. Market Leaders

INPUT's new format identifies user expenditures by each of the four professional services segments for each vendor, as well as the traditional "total expenditures" in professional services. The top 20 vendors of professional services in the U.S., listed in Exhibit V-1, include hardware vendors, processing/network services vendors, and accounting/management consulting firms.

Leading hardware vendors IBM and Unisys offer professional services through the Complex Systems Division and former Systems Development Corporation subsidiaries, respectively. While IBM offers a broader range of professional services, Unisys has completed numerous large software development projects. NCR, DEC, and Wang each have a substantial presence in the professional services market. As a group, hardware vendors' professional services revenues total nearly $1.8 billion.

Professional services firms selling to the federal government represent the second largest revenue base category at $1.4 billion. Suppliers to the federal government comprise MITRE, Emhart/PRC, BDM International, TRW, and Logicon.

The traditional vendors of processing and network services, Computer Sciences Corporation (CSC) and Boeing Computer Systems (BCS), have broadened their businesses to include substantial professional services. Revenues for both firms, which offer the full range of professional services, total more than $700 million.

The category, services firms, has the greatest number of vendors and is dominated by "Big Eight" accounting firms such as Andersen Consulting (a name change by Arthur Andersen partners to acknowledge the size and growth of its non-accounting business), Peat Marwick, Main, and Coopers & Lybrand. All three firms offer software development, consulting, and education and training services, with 1987 user expenditures totaling $760 million.

EXHIBIT V-1

TOP 20 PROFESSIONAL SERVICES VENDORS
1987

Rank	Vendor	User Expenditures ($ Million)				
		Software Development	Consulting	Education and Training	System Operations	Total
1	IBM	599	244	173		1,016
2	CSC	391	78	26	26	521
3	MITRE	365	130	20		415
4	Unisys	310	84	20		414
5	Andersen Consulting	267	57	57		381
6	Emhart/PRC	238	30	30		298
7	BDM International	286				286
8	TRW	205	68			273
9	BCS	59	4	4	150	217
10	Peat, Marwick, Main	125	46	19		190
10	Coopers & Lybrand	146	25	19		190
11	Nat'l Education Corp			171		171
12	Advanced Systems			169		169
13	CTG	137	16	15		168
14	DEC	85	37	14		136
15	GM/EDS	77	26	26		129
16	Logicon	91	29			120
16	McAuto	78	31	11		120
17	NCR	88	27			115
18	CAP Gemini America		111			111
18	Wang	83	23	5		111
19	Sterling Software	78	10	10		98
20	American Mgmt Systems				93	93

3. Segment Leaders

This report moves from figures for the overall market to a detailed evaluation of competitors in each professional services market segment. The next four exhibits present the leading vendors in each segment.

Before examining at the top vendors, this report reviews the relative size of the segments. The largest, software development, had 1987 user expenditures of $7.5 billion; in the second largest segment, consulting, users spent $2.5 billion; for education and training, the third largest segment, is a $1.6 billion segment; and for systems operations, the smallest segment, users spent about $880 million in 1987. User expenditures for software development were three times those for consulting, more than four times those for education and training, and nearly nine times the expenditures for systems operations.

The leading vendors for 1987 in the software development segment, shown in Exhibit V-2, include three computer manufacturers, four accounting or consulting firms, three diversified manufacturing firms, and one vendor of mainly IS-related professional services.

Both IBM's and Unisys' revenues in "software development" exceed the revenues of many computer manufacturers and software vendors. The top vendors hold a combined market share of 28%, compared to 34% for 1986.

In the "consulting" segment, IBM leads followed relatively closely by Cap Gemini. After Cap Gemini, revenues of leading vendors drop to the $50-75 million range. As shown in Exhibit V-3, these vendors hold a combined 34% market share, versus 46% for the 1986 leaders.

IBM's revenues in "education and training" exceed those of Advanced Systems, Inc. by a small margin. As a specialized service, education and training attracts specialized vendors such as National Education Corporation, parent of Applied Learning and Deltak, and McGraw Hill's Training Systems Division. The combined market shares of the top 11 vendors has decreased from 49% in 1986 to a 1987 level of 43%, as shown in Exhibit V-4.

The top 10 "system operations" (previously called "facilities management") vendors' combined market share decreased from a 1986 level of 72% to 68% in 1987. Please see Exhibit V-5. Boeing Computer Services (BCS) took over the top spot from Computer Sciences Corporation, where estimated systems operations revenues tumbled from $235 million to $26 million. The 1987 user expenditures for American Management Systems (AMS), Martin Marietta Data Systems (MMDS), and the Electronic Data Systems (EDS) subsidiary of General Motors exceeded $70 million.

EXHIBIT V-2

PROFESSIONAL SERVICES LEADERS SOFTWARE DEVELOPMENT SEGMENT 1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	IBM	599	8
2	Computer Sciences	391	5
3	MITRE Corp.	365	5
4	Unisys	310	4
5	BDM International	286	4
6	Andersen Consulting	245	4
7	Emhart/PRC	238	3
8	TRW	205	3
9	Coopers & Lybrand	146	3
10	Computer Task Group	137	2
11	Peat, Marwick, Main	125	2
12	Logicon	91	1
13	NCR	88	1
14	DEC	85	1

EXHIBIT V-3

PROFESSIONAL SERVICES LEADERS
CONSULTING SEGMENT
1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	IBM	244	10
2	CAP Gemini	111	4
3	Unisys	84	3
4	Computer Sciences Corp.	78	3
5	GEISCO	74	3
6	TRW	68	3
7	CACI, Inc.	64	3
8	Andersen Consulting	57	2
9	Arthur D. Little & Co.	57	2
10	McDonnell Douglas ISG	54	2
11	Temple, Barker & Sloane	50	2

EXHIBIT V-4

PROFESSIONAL SERVICES LEADERS
EDUCATION AND TRAINING SEGMENT
1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	IBM	173	11
2	National Education Corp.	171	11
2	Advanced Systems Inc.	169	10
3	Price Waterhouse & Co.	59	4
4	Andersen Consulting	57	4
5	Control Data Corp.	40	2
6	Digital Equipment Co.	30	2
7	Planning Research/Emhart	30	2
8	Syscon/Harnischfeger	29	2
9	Unisys	28	2
10	NCR Corporation	27	2
11	National Education Corp.	26	2
11	GM/EDS	26	2
11	CSC	26	2
12	McGraw Hill	25	2

EXHIBIT V-5

PROFESSIONAL SERVICES LEADERS
SYSTEMS OPERATIONS SEGMENT
1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	Boeing Computer Services (BCS)	150	17
2	American Mgmt. Systems	93	11
3	Martin Marietta Data Systems	77	9
4	General Motors/EDS	74	8
5	BDM International	51	6
6	Science Management Corp.	41	5
7	COMARCO	30	4
8	Systems & Computer Techn. Corp.	28	3
9	Computer Sciences Corp.	26	3
10	Martel Laboratories Inc.	20	2

4. Professional Services Leaders by Vendor Category

This section lists the leading professional services vendors on the basis of the following 14 supplier categories:

- Federal government (professional services vendors)
- Computer manufacturers
- Publicly traded firms
- Software firms
- Public accounting firms
- Turnkey systems vendors
- Manufacturing-based spinoff firms
- Processing/network services firms
- Non-U.S. vendors
- Not-for-profit organizations
- Management consulting

- Temporary personnel agencies
- Telecommunications firms
- Industry-specific firms

Professional services vendors serving mainly the federal government, include CSC, Unisys, Boeing, General Motors/Hughes and General Motors/EDS, Martin Marietta, Honeywell, Boeing, and Lockheed. In addition to offering a full range of IS professional services, these vendors may offer systems integration. In 1987 the top 10 vendors accumulated a combined market share of 35% versus a combined share of 50% for 1986. These vendors are listed in Exhibit V-6.

EXHIBIT V-6

LARGEST FEDERAL GOVERNMENT PROFESSIONAL SERVICES VENDORS, 1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	Computer Sciences Corp.	292	8
2	Unisys	175	5
3	General Motors/Hughes	134	4
4	IBM	132	4
5	Martin Marietta	94	3
6	Honeywell	86	3
7	Boeing Computer Services	68	2
8	Lockheed (LEMSCO)	55	2
9	Emhart/PRC	54	2
10	General Motors/Electronic Data Systems	48	2

Exhibit V-7 shows the leading computer manufacturers offering professional services. The two leaders, IBM and Unisys, sell mainly mainframes, while minicomputers make up most of the sales of five of the remaining eight firms.

EXHIBIT V-7

LEADING COMPUTER MANUFACTURERS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)
1	IBM	1,017
2	Unisys	414
3	DEC	144
4	NCR	136
5	Wang Laboratories	106
6	Harris Corp.	72
7	Hewlett-Packard	63
8	Control Data	50
9	Honeywell Bull	21
10	Data General	16

* For Professional Services Only

The leading publicly traded firms offering professional services to the commercial sector are shown in Exhibit V-8. The stock of six of the eight firms listed trade Over-The-Counter; the other two firms trade on the New York Stock Exchange.

EXHIBIT V-8

LEADING PUBLICLY TRADED FIRMS IN COMMERCIAL PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)	Stock Exchange
1	Computer Task Group	162	NYSE
2	AGS Computers	76	NYSE
3	Computer Horizons	70	OTC
4	Analysts International	65	OTC
5	Continuum Co.	64	OTC
6	Systems & Computer Technology Corp. (SCT)	34	OTC
7	Teknowledge	15	OTC
8	Advanced Computer Techniques (ACT)	7	OTC

* For Professional Services Only

Two of the three largest publicly traded firms in federal professional services trade on the New York Stock Exchange, while the third, BDM International, was recently acquired by Ford Aerospace & Communications. Please see Exhibit V-9. The top three firms together account for nearly $1 billion in 1987 revenues in professional services.

More software firms than ever are providing professional services to client companies. Professional services represent a good means for account control and adding value to vendors' current packaged software products. INPUT expects large software vendors such as MSA, Computer Associates International, and Oracle, to aggressively market their professional services capabilities. Exhibit V-10 lists the leading software vendors in professional services.

EXHIBIT V-9

LEADING PUBLICLY TRADED FIRMS IN FEDERAL PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)	Stock Exchange
1	Computer Sciences Corp.	521	NYSE
2	BDM International	286	**
3	Logicon	178	NYSE
4	Sterling Software	98	ASE
5	Am. Management Systems	94	OTC
6	Bolt, Beranek & Newman	88	NYSE
7	CACI, Inc.	86	OTC
8	Dynamics Research Corp.	82	OTC
9	Telos Corp.	74	OTC
10	Computer Data Systems	47	OTC

* For Professional Services Only

** Acquired by Ford Aerospace

EXHIBIT V-10

LEADING SOFTWARE FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)
1	Sterling Software	98
2	Comarco	64
3	M/A/R/C	59
4	Policy Management Systems Corp.	58
5	Compuware Corp.	32
6	MSA	30
7	Computer Associates International	20
8	American Software	19
9	Comshare	17
9	Oracle	17
10	Cognos	14

* For Professional Services Only

The "Big Eight" public accounting firms together account for nearly $1.2 billion in 1987 user expenditures for professional services. While Andersen Consulting has received most of the publicity, Peat Marwick Main and Coopers & Lybrand have built substantial professional services businesses, as shown in Exhibit V-11.

EXHIBIT V-11

LEADING PUBLIC ACCOUNTING FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)
1	Andersen Consulting**	381
2	Peat, Marwick, Main	190
2	Coopers & Lybrand	190
3	Arthur Young	101
4	Price Waterhouse	92
5	Deloitte, Haskins & Sells	80
6	Touche Ross	67
7	Ernst & Whinney	52

* For Professional Services Only

** Andersen Consulting is the new name for the consulting portion of the Arthur Andersen & Co. partnership

Turnkey vendors now account for more than $100 million in professional services, as shown in Exhibit V-12. Of the seven firms listed, only Computervision/Prime and Auto-Trol Technology sell cross-industry CAD/CAM/CAE systems; the other firms sell products to specific vertical industries.

EXHIBIT V-12

LEADING TURNKEY SYSTEM VENDORS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	User Expenditures* ($ Millions)
1	HBO & Co.	44
2	Triad Systems Corp.	21
3	Computervision/Prime	20
4	ASK Computer Systems	15
5	TDS Healthcare Systems	8
6	Profitkey International	2
7	Auto-Trol Technology	2

* For Professional Services Only

INPUT has identified a class of professional services vendor called "manufacturing-based spinoff" to represent those professional services firms spun off from large manufacturing companies. While five firms are represented in Exhibit V-13, other large "spinoffs" such as Boeing Computer Services (BCS) or McDonnell Douglas Automation (McAuto), have been classified elsewhere on the basis of their primary IS activity. Nevertheless, as a whole "spinoffs" will grow in importance. New market entrants include John Deere, Ameritech, Phillips Petroleum, Pennzoil, CSX Technology, and Bethlehem Steel.

EXHIBIT V-13

LEADING MANUFACTURING-BASED SPINOFF FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Spinoff Firm	Parent Company	User Expenditures* ($ Millions)
1	Baxter-Travenol Labs	Baxter-Travenol	66
2	Martin Marietta Data Systems	Martin Marietta	31
3	Xerox Computer Services	Xerox	10
4	AT&T Data Services	AT&T	9
5	Babcock & Wilcox	McDermott Co.	5

* For Professional Services Only

Two processing/network services vendors, Boeing Computer Services and McDonnell Douglas Automation, did well in 1987 in professional services, with combined revenues at nearly $350 million. Please note that the top four vendors listed in Exhibit V-14 sell "general purpose" processing services, versus industry-specific services sold by the remaining eight vendors.

EXHIBIT V-14

LEADING PROCESSING/NETWORK SERVICES VENDORS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	Parent Company	User Expenditures* ($ Millions)
1	Boeing Computer Services	Boeing Co.	217
2	McDonnell Douglas Automation	McDonnell Douglas	119
3	GEISCO	General Electric	83
4	GTE Telenet Communications	GTE	43
5	Securities Industry Automation Corp. (SIAC)	-	40
6	Equifax	-	31
7	Shared Medical Systems	-	20
8	Quotron Systems	-	14
9	VISA U.S.A.	VISA International	13
10	National Computer Systems	-	11
11	On-Line Computer Library Center (OCLC)	-	5
12	Sungard Data Systems	Sun Oil Company	4

* For Professional Services Only

The U.S. information services business includes a handful of non-U.S. firms, which have made their mark in professional services. The most successful is Paris-based Cap Gemini Sogeti, with $111 million in 1987 professional services revenues. While British, Canadian, and Australian firms are market leaders (shown in Exhibit V-15), four of the seven firms listed are U.K. based.

EXHIBIT V-15

LEADING NON-U.S. VENDORS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	Home Country	User Expenditures* ($ Millions)
1	CAP Gemini (America)	France	111
2	Logica/Data Architects	U.K.	21
3	Computer Power Pty. Ltd.	Australia	20
4	SD/SCICON	U.K.	17
5	SHL Systemhouse	Canada	15
6	Information Consulting Group, Inc. (Saatchi & Saatchi)	U.K.	6
7	Thorn EMI	U.K.	2

* For Professional Services Only

Not-for-profit organizations effectively compete in the U.S. professional services market. Led by MITRE Corporation, not-for-profits as a group garnered 1987 professional services revenues of more than $100 million, as shown in Exhibit V-16. Three universities with strong technical and marketing capabilities—Carnegie-Mellon, MIT, and Stanford—bolster this segment's revenues.

EXHIBIT V-16

LEADING NOT-FOR-PROFIT ORGANIZATIONS IN PROFESSIONAL SERVICES 1987

Rank	Organization	User Expenditures* ($ Millions)
1	MITRE Corporation/Metrex	415
2	Rand Corporation	87
3	Battelle Memorial Institute	31
4	Aerospace Corporation	29
5	CalTech/JPL	24
6	MIT/Lincoln Labs	23
7	Illinois Institute of Technology Research Institute (IITRI)	18
8	Armour Research	16
9	Stanford University	13
10	Univerisity of Florida	11
11	University of New Mexico	10
11	Carnegie-Mellon University	10

* For Professional Services Only; Includes Federal and Commercial Markets

Management consulting firms as a group accounted for more than $75 million in 1987 user expenditures for U.S. professional services. Five of the six leading consultants identified in Exhibit V-17 specialize in the information services business. In contrast, Arthur D. Little offers general consulting services.

EXHIBIT V-17

LEADING MANAGEMENT CONSULTING FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Company	User Expenditures* ($ Millions)
1	Arthur D. Little	18
2	Index Group**	16
3	Nolan Norton	13
4	Temple, Barker & Sloane	12
5	The Mac Group	8
6	Infotech	4

* For Professional Services Only

** Acquired by Computer Sciences Corporation in September 1988

Temporary personnel agencies have begun to capitalize on the shortage of qualified programmers/analysts. Exhibit V-18 identifies major players. Three agencies—Computer Dynamics (a subsidiary of Adia), Manpower (the U.S. subsidiary of U.K.-based Blue Arrow p.l.c.), and Computer People—offer programmers/analysts on a short-term basis.

EXHIBIT V-18

LEADING TEMPORARY PERSONNEL AGENCIES IN PROFESSIONAL SERVICES 1987

Rank	Company	User Expenditures ($ Millions)
1	Adia/Computer Dynamics	22
2	Blue Arrow/Manpower	9
3	Computer People	2

The plethora of telecommunications-based professional services problems requires a different approach than that offered by professional services vendors with less direct telecom experience. As indicated in Exhibit V-19, nearly all the Regional Bell Operating Companies (RBOCs) and AT&T have subsidiaries performing professional services. The largest, Bell Communications Research (Bellcore), is chartered with developing different switching systems for internal use by the seven RBOCs.

EXHIBIT V-19

LEADING TELECOMMUNICATION FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	Subsidiary	User Expenditures* ($ Millions)
1	Bell Communications Research (Bellcore)	-	65
2	NYNEX	BIS Group/NYNEX Service Co./ AGS	24
3	Ameritech	Ameritech Services/ Ameritech Communications	19
4	AT&T	AT&T Technologies	10
5	Pacific Telesis	Pactel Communications Multicom	9
6	US West	US West Information Services	8
7	Bell Atlantic	Technology Concepts	7
8	Southern New England Telecommunications	SNET Systems	4

* For Professional Services Only

Just as telecommunications companies require certain technical expertise, users in other vertical markets require specific business and technical expertise. To meet these professional services needs, firms specializing in software or processing services are offering professional services. Exhibit V-20 lists firms with expertise in serving customers in finance, insurance, medicine, and utilities.

EXHIBIT V-20

LEADING INDUSTRY-SPECIFIC SERVICE FIRMS IN PROFESSIONAL SERVICES 1987

Rank	Vendor	Industry Specialization	User Expenditures* ($ Millions)
1	Logica/Data Architects	Finance/Insurance	21
2	John Hancock Health Plans	Medical	11
3	E.I. International**	Utilities	8
4	Capsco/PALLM	Insurance	7
5	Dyatron Corp.	Finance	6
6	Petroleum Information Corp.	Oil	5
6	Infomed	Medical	5
6	Philadelphia Suburban Corp.	Utilities	5
7	Utility & Municipal Services	Utilities	3
8	Finserv	Finance	1

* For Professional Services Only

** Formerly Energy International

B

New Entrants to Professional Services

As the professional services market has matured relatively quickly, it has attracted about a dozen new entrants in the past two years. A key observation from the list of vendors in Exhibit V-21 is the proliferation of subsidiaries/divisions of Fortune 500 manufacturing and Fortune 50 services and transportation companies. In short, many large firms want to leverage their internal experience in professional services.

EXHIBIT V-21

NEW ENTRANTS TO PROFESSIONAL SERVICES 1987-1988

Date (Month/ Year)	Company (Parent Co.)	Professional Services
6/87	Integrated Technologies Group (First Capital Corp.)	Consulting, Software Development
6/88	AMR General Computing (American Airlines)	Network Services, Consulting
8/88	Connectivity, Inc.	Consulting (Telecommunications)
10/88	On-Line Software International	Software Development
10/88	Information Consulting Group (Saatchi & Saatchi)	Consulting, Software Development
11/88	C^3 I Division (Lockheed)	Consulting, Training and Education
Unknown	John Deere Co.	Consulting, Software Development
Unknown	Ameritech	Consulting, Software Development, Education and Training
Unknown	Bethlehem Steel Information Services	Consulting, Software Development
Unknown	Proctor & Gamble	Consulting, Software Develoment, Education, & Training

The possible reasons for such powerful new entrants include:

- An internal accounting change from overhead to a profit-center
- A change in corporate strategic directions, with professional services as the logical lead-in to all-important "systems integration" services
- A philosophical change from serving in-house users to serving a broader customer base, thus permitting a more thorough and professional approach

C

Mergers and Acquisitions in Professional Services

INPUT has identified at least 22 mergers or acquisitions occurring in 1987 or 1988 involving professional services vendors. Why has as much activity, as shown in Exhibit V-22 occurred? Because professional services and closely-related systems integration are hot delivery modes, representing key services for designing and implementing strategic systems.

In those instances where the value of the transaction is known, these mergers and acquisitions can be characterized as ones where:

- P/E ratios exceed industry norms
- Acquirers are buying technical capabilities and program managers
- Acquirers are also buying future revenue streams (contracts in progress)
- Acquirers are betting that synergies will pay off in 3-5 years

A majority of acquisitions involve firms with software development and project management capabilities, keys to success in professional services and systems integration. Only one firm, ZeroOne Systems, performs mainly systems operations services.

EXHIBIT V-22

MERGERS AND ACQUISITIONS IN PROFESSIONAL SERVICES 1987-1988

Date (Month/ Year)	Acquiring Firm	Professional Services	Value ($ Millions)
2/87	Computer Task Group	Analysts International	Unknown
4/87	Saatchi & Saatchi Consulting	Cleveland Consulting Associates	Unknown
8/87	NYNEX	BIS Group (London)	Unknown
7/87	Sterling Software	ZeroOne Systems	Unknown
8/87	Litton Computer Services	Integrated Automation	90
10/87	Emhart Corp.	Advanced Technology	140
12/87	Sequa Corp.	Atlantic Research Corp.	316
4/88	GM/EDS	M & SD	Unknown
6/88	Cincinnati Bell	Vanguard Technology International	71
6/88	GM/EDS	Mtech Crop.	280 (80%)
7/88	Ford Aerospace	BDM Corp.	451
7/88	L.A.-based Subsidiary of Computer People plc	Sterling Software's U.S. Professional Services Organization	Max. of 16
10/88	CGI Systems (Paris)	The Matrix Organization	Unknown
9/88	Computer Sciences Corp	Index Group	Unknown
9/88	Adia Services	Computer Dynamics	25-30*
10/88	GM/EDS	General Data Systems	Unknown
10/88	GM/EDS	China Management Systems (Taiwan)	Unknown (50%)
10/88	IMI Systems, Inc.	Sterling Software's U.K. Professional Services Organization	Max. of 10
10/88	NYNEX	AGS Computers	275
11/88	Oracle Systems	Falcon Systems	19
11/88	Altai (Merger)	Goal Systems	14
11/88	Concept Systems	AIS Inc.	Unknown
Pending	Knoll Capital Management	C3	138

*INPUT Estimate

D

Joint Ventures and Marketing Alliances in Professional Services

In 1987 and 1988, at least 14 professional services alliances were formed. During the same time period, INPUT did not find any relevant joint ventures. Of the 14, nine involved marketing alliances for software products, three were formed to promote services, and two were for marketing hardware.

The vendors involved, both professional services and other, were generally large companies with focused product lines or services. Exhibit V-23 lists what appear to be symbiotic relationships. The messages are: (1) No matter how large a company is, it cannot offer all professional services to all market niches. (2) While marketing alliances are not perfect, the benefits outweigh the problems.

EXHIBIT V-23

JOINT VENTURES AND MARKETING ALLIANCES IN PROFESSIONAL SERVICES 1987-1988

Type	Professional Services Vendor	Other Vendor(s)	Product/ Services
Alliance	Computer Task Group	Relational Technology	Software
Alliance	Unisys	Computer Associates Int'l	Software
Alliance	Digital Equipment	Apple Computer	Hardware
Alliance	Arthur Andersen	MSA/McCormack and Dodge	Software
Alliance	Deloitte, Haskins, and Sells	Holland Systems Corp.	Software
Alliance	Arthur Young	KnowledgeWare	Software
Alliance	NYNEX	Tandem Computers	Hardware
Alliance	Computer Horizons	Must International	Software
Alliance	Coopers & Lybrand	NASTEC (Australia)	Services
Alliance	Oracle Corp.	Booz, Allen, and Hamiltion	Services
Alliance	McDonnell Douglas	Pansophic	Software
Alliance	NASTEC	Pansophic	Software
Alliance	Index Technology	Pansophic	Software
Alliance	Deloitte, Haskins, and Sells	Index Technology	Services

E

Firms No Longer Offering Professional Services

In general, firms exiting a particular market do not post a large sign reading "Closeout Sale—Leaving the Professional Services Market." Rather, marketing literature and the annual report de-emphasize certain professional services or focus.

Surprisingly, Sterling Software declared its strategic intentions at an August 1988 announcement, following the acquisition of Informatics. Sterling agreed to sell its U.S. and non-U.S. professional services Groups for a maximum of $16.5 million and $11 million, respectively, indicated in Exhibit V-24. The company will focus on providing services to the Federal government, financial software, software for law firms and CPA firms, and systems software.

EXHIBIT V-24

FIRMS NO LONGER OFFERING PROFESSIONAL SERVICES 1987-1988

Date (Month/ Year)	Activity	Parent Company	Price ($ Millions)
8/88	U.S. Professional Services Group	Sterling Software	11*
8/88	Non-U.S. Operations of Professional Services Group	Sterling Software	8**

* Plus potential payments of up to $5.5 million over two years

** Plus potential payments of up to $3.0 million over one year

F

Systems Integration Market

1. Introduction

The systems integration delivery mode is closely related to professional services, differing by user expenditures for hardware and packaged software.

This section highlights the leaders from the commercial and Federal markets, and indicates leading vendors in the combined commercial/ Federal marketplace.

INPUT tracks systems integration for the commercial and Federal sectors through separate programs. For additional information, please refer to the following related INPUT reports:

- *Federal Systems Integration Market*
- *The Impact of Systems Integration on Professional Services Vendors*
- *Commercial Systems Integration Implementations*

Using the next three sections, INPUT evaluates market leaders in these categories:

- Combined commercial/federal systems integration market
- Commercial systems integration market
- Federal systems integration market

2. Combined Commercial/Federal Systems Integration Market Leaders

The ten leading vendors of systems integration services, shown in Exhibit V-25, represent a mix of hardware manufacturers and computer services firms.

EXHIBIT V-25

COMBINED COMMERCIAL/FEDERAL SYSTEMS INTEGRATION SEGMENT LEADERS 1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	General Motors/EDS	774	20
2	IBM	639	17
3	CSC	362	9
4	Andersen Consulting	305	8
5	Unisys	218	6
6	Grumman Data Systems	136	4
7	Control Data Corp.	123	3
8	Emhart/PRC	116	3
9	SHL Systemhouse	114	3
10	Science Application International	105	3

On a combined basis General Motors/EDS is the largest systems integration vendor in 1987, eclipsing IBM. It has $320 million in federal business to IBM's $155 million.

Computer hardware manufacturers are represented by three vendors—IBM, Unisys, and Control Data. The four "pure" computer services vendors include Computer Sciences, Emhart/Planning Research, Canada-based SHL Systemhouse, and Science Applications International. The "top ten" also includes one network services vendor, Grumman Data Systems, and one public accounting/consulting firm, Arthur Andersen.

3. Commercial Systems Integration Market Leaders

Many of the leading commercial systems integration vendors for 1987 differ from the 1986 market leaders. Returning vendors in 1987 include IBM, General Motors/EDS, Arthur Andersen, Unisys, and Science Applications International. New vendors for 1987 include SHL Systemhouse, Grumman Data Systems, Control Data, and AGS Computers.

In 1987, the top ten vendors accounted for 68% of user expenditures, versus 58% in 1986. As indicated in Exhibit V-26, the top five vendors concentrated their portion of commercial systems integration expenditures, representing 47% in 1987—up from 39% in 1986.

4. Federal Systems Integration Market Leaders

The Federal systems integration market leaders for 1987, shown in Exhibit V-27, are based on the current government fiscal year (GFY) obligations listed in Federal Procurement Data Center reports and may not reflect some awards made late in the fiscal year. Frequent agency targets for systems integration activities include NASA, and the Departments of the Air Force, Army, Treasury, and Energy.

Significant changes have occurred among systems integration vendors serving the federal sector. In 1986, EDS was not among the top ten vendors; in 1987, it led the market with nearly 50% more revenues than the number two vendor, CSC. IBM fell from first to third place. Leaders in 1986—General Motors/Hughes, Rockwell International, Control Data, Honeywell, and Shared Medical Systems—were no longer market leaders in 1987. New entrants in 1987 to the top ten include Emhart/Planning Research, Federal Data Corporation, and Digital Equipment Corporation.

EXHIBIT V-26

COMMERCIAL SYSTEMS INTEGRATION MARKET SEGMENT LEADERS 1987

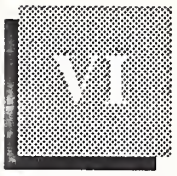
Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	IBM	484	28
2	General Motors/EDS	454	26
3	Andersen Consulting	265	15
4	Computer Science Corp.	167	10
5	SHL Systemhouse Inc.	114	2
6	Grumman Data Systems	96	6
7	Control Data Corp.	84	5
8	AGS Computers	74	4
9	Unisys Corp.	73	4
10	Science Applications Int'l	72	4

EXHIBIT V-27

FEDERAL SYSTEMS INTEGRATION MARKET SEGMENT LEADERS 1987

Rank	Vendor	User Expenditures ($ Millions)	Market Share (Percent)
1	General Motors/EDS	320	15
2	Computer Sciences Corp.	195	9
3	IBM	155	7
4	Unisys	145	7
5	Emhart/Planning Research	116	6
6	Martin Marietta Data Systems	80	4
7	Federal Data Corporation	80	4
8	TRW	78	4
9	Digital Equipment Corp.	65	3
10	Boeing Computer Services	60	3

Vendor Profiles



Vendor Profiles

A Introduction

The ten leading professional services vendors, representing diverse vendor categories, are profiled in this chapter.
The vendor categories represented include:

- Hardware manufacturer (IBM, Unisys)
- Commercial professional services firm (CSC)
- Federal (government) professional services firm (MITRE, Emhart/ Planning Research Corporation, and BDM International)
- Consulting firm (Arthur D. Little)
- Accounting firm (Andersen Consulting)
- Discrete manufacturing company (TRW)
- Processing/network services firm (Boeing Computer Services)

Each vendor profile will contain the following information:

a. Products/services
b. Markets served
c. Company strategy
d. Recent activities
e. Future directions

1. IBM

a. Products/Services

IBM Corporation offers software development, consulting, and education and training professional services. While certain federal government contracts may call for systems operations capabilities, IBM prefers to utilize its processing/network services capabilities to fulfill these requirements.

b. Markets Served

IBM offers professional services to all vertical markets, concentrating on banking and finance, process and discrete manufacturing, insurance, transportation, and retail and wholesale distribution.

c. Company Strategy

IBM uses its extensive professional services capabilities to help maintain account presence and, indirectly, account control. Consulting is used as the "front-end" service, setting future IS direction and establishing the need for software development and education and training services.

d. Recent Activities

The Company formed a separate division for systems integration, a related Professional Service, building on the extensive capabilities within its Federal Systems Division. IBM established marketing or hardware alliances with Andersen Consulting and Hogan Systems.

e. Future directions

John Akers has publicly stated that "by 1990, software and services will represent around 50% of our business (from a current level of around 18%)." Whether IBM precisely attains this lofty goal is not the point; rather, it is that software and professional services will play an increasingly important role in IBM's future growth.

2. Computer Sciences Corporation

a. Products/Services

Computer Sciences Corporation (CSC), founded in 1959, is the largest independent professional services company in the industry. CSC provides requirements analysis, software development, systems engineering and integration, communication systems engineering, and network consulting services.

b. Markets Served

CSC serves the federal government through its Systems Group and commercial markets through its professional services Group, headquartered in El Segundo, California. Target industries include state and local governments, health care, telecommunications, discrete and process manufacturing, insurance, banking and finance, and accounting.

c. Company Strategy

CSC will continue to focus its professional services capabilities on the industries noted above. Acquisitions and joint ventures may be used to address these markets.

d. Recent Activities

To build its professional services capabilities, CSC acquired Computer Partners Inc. (Waltham, MA) in 1986. CSC also established a separate group in Piscataway, NJ called Communications Industry Services for specialized services for telephone companies.

e. Future Directions

CSC will continue its acquisition of small, niche-oriented professional services suppliers. More alliances with hardware and packaged software vendors is expected to further develop its systems integration capabilities.

3. MITRE Corporation

a. Products/Services

MITRE is an independent, not-for-profit professional services firm engaged in scientific and technical activities. MITRE performs mainly software development, with secondary contributions to its revenue from consulting and education and training.

b. Markets Served

Slightly more than 50% of MITRE's work is performed for the U.S. Air Force; about 27% is for other defense-related agencies; and the remaining 23% is for civil agencies of the federal government. Most of MITRE's work is concentrated in highly classified Command, Control, Communications, and Intelligence (C3I) activities.

c. Company Strategy

MITRE is expected to maintain a highly visible presence to the Air Force by constant improvements to its Bedford, MA programs, facilities, hiring, and training.

d. Recent Activities

In 1987, MITRE reorganized its C3I Group in Bedford serving the Air Force's Electronic Systems Division at nearby Hanscom Field. Affected by the reorganization were computer security work and networking, image processing and intelligence programs, a major surveillance project and other sensor system programs, military air traffic control, and tactical control and air defense systems activities.

e. Future Directions

MITRE will expand its focus outside the federal government to state and large local government and non-U.S. projects with heavy communication requirements.

4. Unisys Corporation

a. Products/Services

Unisys became a major player in the professional services business through Burroughs' former Systems Development Corporation (SDC) subsidiary in Santa Monica, CA. Today, Unisys offers software development, the full complement of consulting services, and education and training services.

b. Markets Served

Unisys concentrates on the federal government, state and local governments, transportation, and banking and finance.

c. Company Strategy

Like other hardware vendors, Unisys uses its professional services activities to help maintain strategic account contact and control, as well as to understand customers' future IS directions.

d. Recent Activities

Unisys won a $3+ billion federal government contract to upgrade systems for military logistics applications, which will utilize extensive professional services capabilities.

The acquisition of Convergent Technologies will broaden its exposure to smaller business, which will require microcomputer-oriented professional services.

e. Future Directions

Unisys must first digest the acquisition of Convergent with its Open Systems software and Baron Data Systems turnkey systems subsidiaries. Concurrently, INPUT expects Unisys to rapidly build strong professional services capabilities for the UNIX marketplace.

5. Andersen Consulting

a. Products/Services

Andersen Consulting, formerly the Management Information Consulting Division of "Big Eight" accounting firm Arthur Andersen & Company, provides planning, design, and implementation of computer-based information systems, education and training, and software development services.

b. Markets Served

Andersen Consulting aggressively markets to the process and discrete manufacturing industries, followed by banking and finance, insurance, and state and local governments.

c. Company Strategy

Andersen Consulting has developed proprietary software products to assist in project management and computer-aided software engineering (CASE) for client companies.

d. Recent Activities

Andersen Consulting opened five Advanced Systems Centers, used for developing client applications. The firm also opened a $13 million Advanced Technology Center (ATC) in Evanston, IL to show an integrated factory-of-the-future and to highlight its corporate capabilities that would enable manufacturing clients to gain such expertise and, indirectly, a competitive advantage.

e. Future Directions

Andersen Consulting will continue to exploit the opportunities in manufacturing and may, based on the success of its first Advanced Technology Center, use a similar approach to attack the finance or insurance industries.

6. Emhart/Planning Research Corporation

a. Products/Services

Planning Research Corporation (PRC), started as a for-profit think tank in 1954, and was acquired by Emhart Corporation in October 1986 for approximately $210 million. Emhart/PRC's professional services, offered through the Company's Systems Services Group, include systems engineering, training and education, software development, independent verification and validation (IV&V) of software, and data management.

b. Markets Served

The Federal government accounts for about 75% of Emhart/PRC's total revenue. U.S. military services account for nearly 25% of current business. State and local governments represent about 5% of total revenues.

c. Company Strategy

Emhart/PRC's strategy includes a sharp focus on the Federal government market, especially the U.S. military. Offering a diverse range of services to the government—engineering, installation, verification and testing, maintenance, and on-going support—through application of advanced technologies remains the foundation of Emhart/PRC's professional services strategy.

d. Recent Activities

The Company's consolidation of professional services subsidiaries in 1985-86 has resulted in a stable organization and increases in professional services revenues of 20-25%. Continued investments in internal training and development have elevated the overall level of professional services skills.

e. Future Directions

As the professional services and systems integration markets converge, Emhart/PRC is expected to acquire small companies with expertise in project management, CASE, AI, and other necessary technologies and management capabilities.

7. BDM International

a. Products/Services

BDM International performs tests, experiments, designs, analyses, research, and systems services. BDM has in-house expertise in artificial

intelligence, advanced computer architectures, image processing, microelectronics, sensors, optical computing, artificial neural computers, and robotics.

b. Markets Served

More than 85% of the Company's work is performed for military branches of the U.S. and allied nations.

c. Company Strategy

The company focuses on contracts for the initial design and development stage of major procurement projects for the military and NATO, leveraging this project knowledge into follow-on professional services business.

d. Recent Activities

BDM won the role as prime contractor/systems integrator (and project manager) for a number of logistics-related projects, ones with heavy professional services requirements.

e. Future Directions

BDM will continue its focus on the logistics area for the U.S. military and NATO-supported allies. Since the organization differentiates itself on the basis of integrating advanced technologies, future growth will come through projects booked in other government agencies where new technologies play a major role in solving complex problems.

8. TRW

a. Products/Services

TRW provides professional services in software development, consulting, and education and training.

b. Markets Served

TRW's main customers include the Federal government, discrete manufacturers, and process manufacturers.

c. Company Strategy

TRW leverages its implementation and operation of large data bases and its knowledge of secure data communications, lasers, microelectronics, space satellites, superconducting materials, and ceramics.

d. Recent Activities

TRW Federal Systems won a $98 million contract to reprogram AWIS, the U.S. Army's worldwide communications system, with the Ada programming language.

e. Future Directions

TRW will leverage its expertise in AI and parallel processing technologies and proprietary software for managing software development projects in order to provide more advanced professional services.

9. Boeing Computer Services

a. Products/Services

Boeing Computer Services (BCS), a division of The Boeing Company, was formed in 1970. In 18 years, BCS has grown to a $1.2 billion IS business offering processing/network services and professional services. Through its Commercial Services Group (CSG), BCS offers professional services in system design and integration, software development, education and training.

b. Markets Served

Captive BCS revenues, mainly for processing/network services to The Boeing Company, represent about $900 million. Professional services are provided to Fortune 1000 companies and Federal and state and local government agencies.

c. Company Strategy

BCS builds on its knowledge of data bases, artificial intelligence, supercomputers, and intelligent control systems.

d. Recent Activities

While successful at meeting the needs of varied industries, BCS will focus on key vertical markets. It reorganized its businesses serving commercial customers and has initially targeted the energy and manufacturing information markets.

e. Future Directions

BCS will concentrate on large projects for state and local governments and possibly some non-U.S. government projects.

The Company could target one or two additional major vertical markets such as banking and finance and insurance, acquiring small companies to help speed its market entry.

10. Peat Marwick, Main, & Co.

a. Products/Services

Through its Information Systems Services Group, Peat Marwick, Main, & Co. (PMM) offers IS consulting and software development services to a worldwide client base.

b. Markets Served

PMM serves financial institutions, government, health care, energy/ natural resources, manufacturing, and education.

c. Company Strategy

Having developed considerable knowledge about the six vertical industries noted above, PMM will continue its focus on certain technologies best suited to serve these markets. These technologies include communications networks, artificial intelligence, 4GL, relational data base management software, and software development methodologies.

d. Recent Activities

In 1987, Peat Marwick acquired Nolan Norton & Co., specialists in information technology planning and management. The firm also acquired a 40% stake in Pittiglio Rabin Todd & McGrath, a firm specializing in manufacturing systems consulting.

e. Future Directions

Future software development and consulting activities will include microcomputing and network applications in the target markets.

11. Coopers & Lybrand

a. Products/Services

Coopers & Lybrand (C&L), one of the "Big Eight" international public accounting firms, offers a complete range of IS Services. Professional services include IS strategy development, designing and implementing telecommunication networks, data security evaluation, contingency planning, software evaluation, pre-implementation review, and software services to help audit computer-based information systems.

b. Markets Served

C&L's professional services focus on ten markets—financial services, manufacturing, health care, government, retail distribution, oil and gas, utilities, law offices, engineering and construction, and education.

c. Company Strategy

Coopers & Lybrand concentrates on providing a full range of professional services to select industry markets. Its services include implementation of advanced technologies such as expert systems. C&L has also developed methodologies for software development.

d. Recent Activities

In early 1987, C&L acquired Walter Ulrich Consulting, a Houston-based firm specializing in data communications systems implementations, helping its expansion into office automation and networking.

In mid-1987, C&L signed a marketing and consulting agreement with Tandem Computers where the two firms will share sales leads and work together on factory automation projects for customers.

e. Future Directions

C&L will expand its services to clients through systems tailored to meet departmental and factory floor computing needs. C&L will focus on telecommunications activities, which will play a more important role in IS strategies and operations.

VII

Opportunities and Recommendations

VII

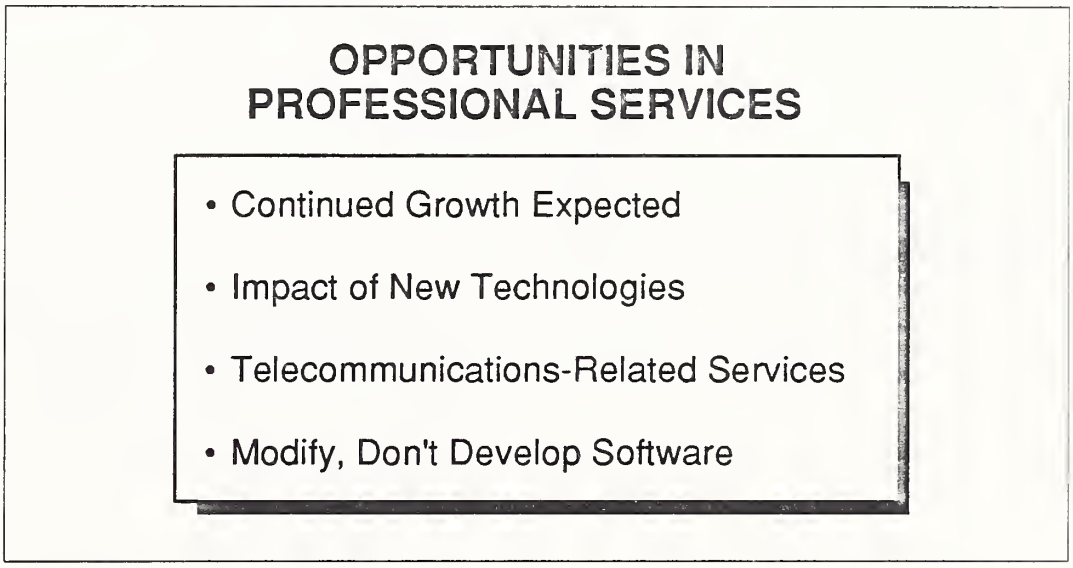
Opportunities and Recommendations

A

Opportunities in Professional Services

Professional services remains a solid, growing market in the information services business. Exhibit VII-1 lists four major opportunities in professional services.

EXHIBIT VII-1



Continued deregulation in financial services, telecommunications, and utilities, will lead to increased use of professional services. More competition from increasingly larger business enterprises will drive major upgrades to strategic systems. The formation of unique service enterprises, such as companies that review employee health care claims or audit bills for travelers, will play a growing role in the need for professional services. Lastly, as more business is done internationally, telecommunications-related professional services will be demanded more.

The constant stream of new technologies represents a major opportunity for professional services vendors. New software products such as distributed relational data base management, 4GL, expert systems, microcomputer/workstation-based, and on-line transaction processing products will create opportunities for vendors. New generations of hardware products

from IBM (AS/400), DEC (MicroVAX and unannounced workstations based on RISC technology), Unisys, NCR, Wang, and other vendors will likely be the main source of professional services opportunities.

The explosion in telecommunications will create various opportunities. The business aspects of network integration and network design and implementation represent the starting points in professional services. Network management, a derivative of systems operations, may turn out to be a necessary service due to its technological and operational requirements.

As vendors of packaged software provide more functionality through off-the-shelf products, software development within professional services will gradually shift to software modification.

B

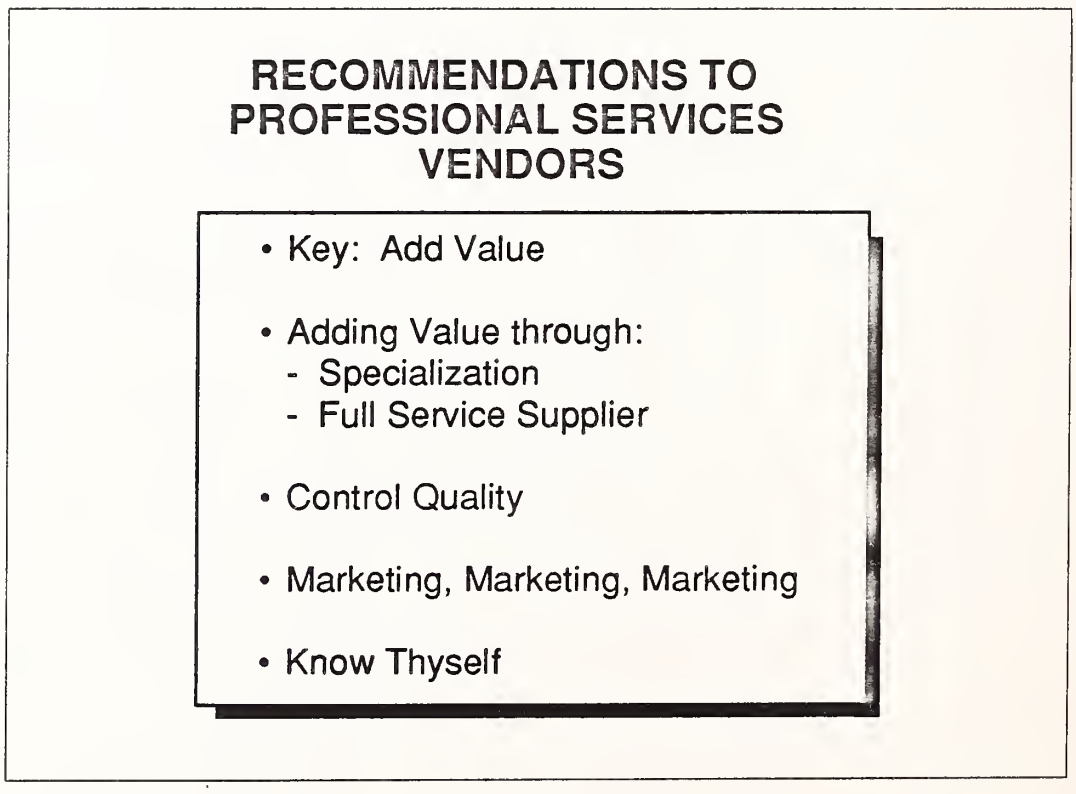
Recommendations

The degree of success of professional services vendors, whether large or small, will depend on the degree to which vendors add value. Depending on the relative size of the vendor, "adding value" has different meanings.

1. Recommendations to Vendors

Exhibit VII-2 shows five key points for consideration, with one for smaller and another for larger professional services vendors.

EXHIBIT VII-2



Smaller professional services vendors should add the most value through a strategy of "specialization" in:

- A vertical industry, with its need for specific software
- Cross industries through detailed knowledge of hardware platforms and system software
- Leading-edge technology

With limited resources, smaller vendors must focus on one strategy or, at most, combine either the vertical or horizontal market focus with understanding of certain leading edge technologies. The obvious option of focusing on a given geographic area will not permit sufficient added value. Due to the proliferation of networks, "telecommuting," and facsimile machines, the value of local technical expertise will diminish.

Larger professional services vendors will add the most value by becoming "full-line" suppliers. Education and training capabilities will exist, since these vendors will have made substantial investments to train their staff. Significant value can be gained directly through expertise in project management, software development, and implementing applications based on new technologies. Value can be added indirectly by establishing joint ventures, offering international capabilities, and offering follow-on systems integration capabilities.

Vendors, large and small, will have to pay more attention to quality and service. Since professional services projects are as much a process as a product, both parties must ensure a solid understanding of the requirements. Once the needs are well understood, the implementation must be professional and of a high quality. More stories are appearing in the trade press about dissatisfied customers of professional services and systems integration vendors, indicating less-than-satisfactory implementation. The only way to prevent this is through good quality control procedures.

In the real estate business, the three key factors for buying a home or investment property are "location, location, location." Similarly, in professional services, the key factor will move quickly from "technical expertise, opportunity selling, and project management" to "marketing, marketing, marketing." Effective marketing includes a clear message—eliminate "techno-babble" and sell features and user benefits. Another aspect of marketing is focus—on industries, services, technologies, or geography. Marketing considers the next step in a process—is systems integration the next logical step for professional services vendors? Marketing is aware of the competition—watch the RBOCs, the Japanese trading companies, and Western Europe-based computer manufacturers. Given the proper emphasis, the current short-term sales focus will migrate to a long-term marketing focus.

The last piece of advice can be summarized as "Know Thyself." Understand what your firm's capabilities are, following the development of a matrix of internal skills and a knowledge of market needs. Evaluate the firm's capabilities in people, technology, and business skills.

Invest in people by first attracting the right people—skills and work style. Provide training in the focus technologies and in management and basic business principles. Organize the company to best utilize the skills and people available.

Invest in technology through a project management methodology, one developed internally or acquired. Be aware of new developments in related technologies such as telecommunications and data communications.

Invest in your company as a user and as a business. As a user, go through the same process for a couple major projects to better understand the customer's perspective. As a business, make a long-term commitment to professional services. It is not a fad—it is a stable business where the leaders have extensive experience and enviable track records. Despite the presence of established players, opportunities exist for aggressive newcomers.

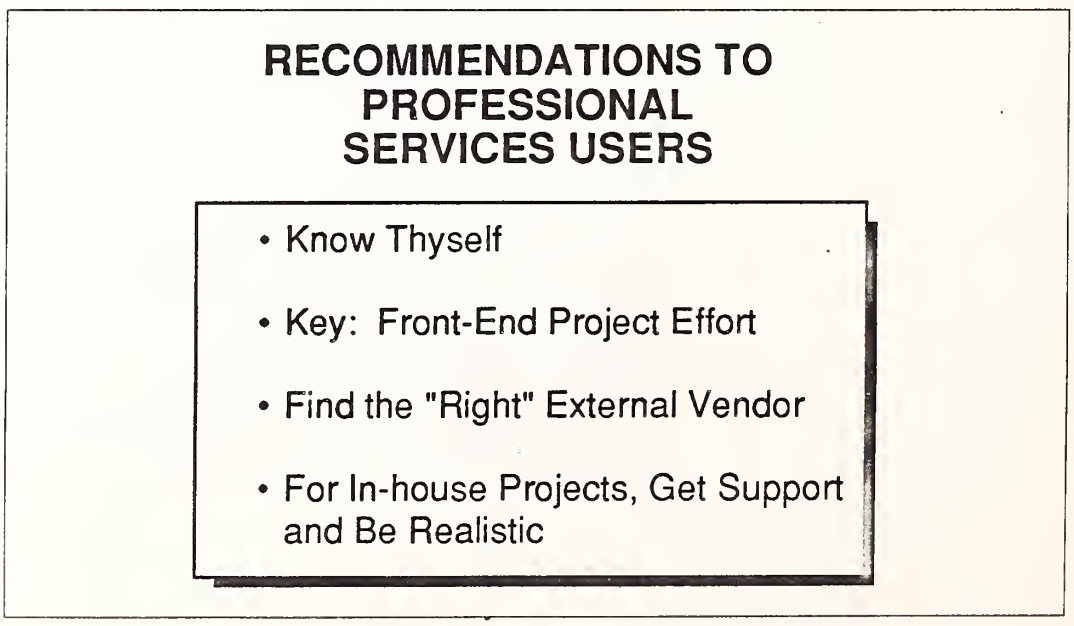
INPUT believes the most successful vendors will be those with:

- Well-defined target markets
- Matched internal capabilities and user needs and
- Expertise in implementing a few leading edge technologies

2. Recommendations to Users

Users should consider certain four actions, outlined in Exhibit VII-3, to get the most out of professional services.

EXHIBIT VII-3



As with vendors, the adage "Know Thyself" establishes the foundation for further actions. User organizations must know themselves from business, technical, and organizational perspectives.

Key business considerations to address before implementing professional services include an evaluation of corporate direction and its strengths and weaknesses, relative position in the industry, and uniqueness. To help ensure that their firm moves in one direction, users must understand their current position before hiring a professional services firm to implement major projects.

Next, the users firm's technical capabilities must be understood. Users may want to employ in-house technical experts to implement part of a project with heavy professional services content. In-house implementation is a viable alternative since the firm may want to keep the consulting, software development, or education and training expertise in-house.

Finally, the organization's key players, structure, flexibility, and capabilities must also be investigated. Even with the right business and technical skills in place, the user organization must be able to handle the process and resulting change.

Whether implementing the project internally or externally, the following guidelines apply. First and foremost, front-end effort is the key to a successful professional services project. Defining the project need and developing the detailed specification and the schedule forces users to agree on the need. Second, an implementation team is crucial for project success. One senior corporate manager should chair the committee that comprises representatives of user departments and the corporate staff. Third, continual monitoring with frequent reporting ensures the project does not get too far along before problems are discovered. Based on the findings from various research projects, INPUT recommends weekly status reporting and monthly review meetings.

Another aspect, finding the "right" vendor, while seemingly obvious, is often overlooked. The right vendor for a project in one user environment may not be the right vendor for the same project serving a different department. Shop around, check references carefully, evaluate the vendor's corporate culture, and review the approach.

If user organizations choose to follow the in-house route, a couple steps can minimize disruptions. First, make sure the right persons, especially those managing aspects of the project and those with specific technical expertise, are available throughout the project. Second, make sure the budget and schedule are realistic. The act of bringing a project in-house should not magically "improve" efficiency by 20-25%! Last, senior managers must fully support these efforts, as they would for a project carried out by a third-party vendor.

3. Summary

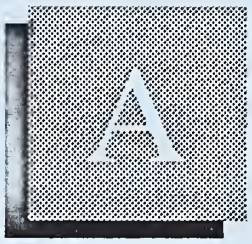
As the professional services delivery mode further matures, the primary differentiator will become the degree of added value, since all vendors will be adding value. The degree of added value, followed by professional services examples, follows:

Low: Experience with few hardware platforms

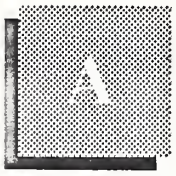
Medium: Provide people with specific hardware or software expertise through temporary services; Offering industry expertise or system/ application software expertise

High: Offer a combination of industry, platform, and software expertise

The challenge for vendors is to offer the highest levels of added value desired by customers, consistent with revenue and profit targets.



Appendix: INPUT Definitions



Appendix: INPUT Definitions

Information Services —Computer-related services involving one or more of the following:

- Processing of computer-based applications using vendor computers (called "processing services").
- Services that assist users in performing functions on their own computers or vendor computer (called "software products" and/or "professional services").
- Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems").

A

User Expenditures

All user expenditures reported are "available" (i.e., noncaptive, as defined below).

Noncaptive Information Services User Expenditures—Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

Captive Information Services User Expenditures—Expenditures received from users who are part of the same parent corporation as the vendor.

B

Delivery Modes

Processing Services —This category includes remote computing services, batch services, processing facilities management, on-line data bases, and value-added networks.

- *Remote Computing Services (RCS)* —Provision of data processing to a user by means of terminals at the user's site(s). Terminals are con-

nected by a data communications network to the vendor's central computer. RCS includes four submodes.

- *Interactive* —Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.

- *Remote Batch* —Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

- *Proprietary Data Base* —Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.

- *User Site Hardware Services (USHS)* —Those offerings provided by RCS vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

  ° Access to a communications network.

  ° Access through the network to the RCS vendor's larger computers.

  ° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

  ° Significant software as part of the service.

• *Batch Services* —These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

• *Processing Facilities Management (PFM)* —Also referred to as "Resource Management," "Systems Management," or "COCO" (contractor-owned, contractor-operated). PFM is the management of all or part of a user's data processing functions under a long-term contract of not

less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user–either onsite, through communications lines, or in a mixed mode.

- *Value-Added Networks (VANs)* —VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category. Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specialty applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

- *Utility* services are those for which the vendor provides access to a computer and/or communications network with basic software that enables users to develop and/or process their own systems. These basic tools often include terminal-handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

Software Products —This category includes user purchases of applications and systems software packages for in-house computer systems.

Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below.

- *Applications Products* —Software that performs processing that services user functions directly related to solving a business or organizational need. The products can be:

  - *Cross industry Products* —Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.

  - *Industry-Specific Products* —Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.

- *Systems Software Products* —Software that enables the computer/communications system to perform basic functions. These products include:

  - *System Control Products* —Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.

  - *Data Center Management Products* —Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

  - *Applications Development Products* —Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

Professional Services—This category includes consulting, education and training, programming and analysis, and some facilities management as defined below.

- *Software development* —This service develops a software system on a custom basis. It includes one or more of the following: user requirements, system design, contract, and programming.

- *Education and Training* —Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* —Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Formerly "Facilities Management")* —This is a counterpart to processing facilities management, except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

Turnkey Systems (also known as integrated systems)—A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single applications solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems are available either as custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors.

- Turnkey systems revenue is divided into two categories.

  - *Industry-specific systems* —that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.

  - *Cross-industry systems* —that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.

- Revenue includes hardware, software, and support functions.

Systems Integration —Services associated with systems design, integration of computing components, installation, and acceptance of computer/communication systems. Systems integration can include one or more of the major information services delivery modes—professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organization. Integration services also may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

C

Hardware/Hardware Systems

Hardware —Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* —Includes all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.

- *Input Devices* —Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* —Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- *Communication Devices* —Includes modems, encryption equipment, special interfaces, and error control.

- *Storage Devices* —Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

Terminals—There are three types of terminals as described below:

- *User-Programmable* —Also called intelligent terminals, including:

  - Single-station or standalone.
  - Multistation shared processor.
  - Teleprinter.
  - Remote batch.

- *User Nonprogrammable*

  - Single-station.
  - Multistation shared processor.
  - Teleprinter.

- *Limited Function* —Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

Hardware Systems —Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* —Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

  - Integrated circuit package.
  - Plug-in board with more memory and peripheral circuits.
  - Console including keyboard and interfacing connectors.
  - Personal computer with at least one external storage device directly addressable by the CPU.

- *Minicomputer* —Usually a 12-, 16- or 32-bit computer that may be provided with limited applications software and support and may represent a portion of a complete large system.

  - Personal business computer.
  - Small laboratory computer.
  - Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers.

- *Mainframe*—Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

  - *Large Computer* —Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, von-Neumann-type processors for system control.

- *Supercomputer* —High-powered processors with numerical processing throughout that is significantly greater than the fastest general-purpose computers, with capacities in the vicinity of 10-50 million floating point operations per second (MFLOPS). Supercomputers fit in one of two categories:

• *Real Time* —Generally used for signal processing in military applications.

• *Non-Real Time* —For scientific use in one of three configurations:

- Parallel processors.
- Pipeline processor.
- Vector processor.

• *Newer Supercomputers* —with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one- to three-gigabyte class are also becoming more common.

• *Embedded Computer* —Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

D
Telecommunications

Networks —Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

• *Common Carrier Network* —A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.

• *Value-Added Network (VAN)* —(See listing under Section B, Delivery Modes.)

• *Local Area Network (LAN)* —Limited-access network between computing resources in a relatively small (but not necessarily contiguous)

area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

- *Baseband* —Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

- *Broadband* —Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

  ° Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).

  ° Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).

  ° High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

Transmission Facilities— Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

- *Mode* —may be either:

  - *Analog* —Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

  - *Digital* —Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

- *Media*—May be any of the following:

  - *Wire* —Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full- duplex balanced lines.

  - *Carrier* —A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* —A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* —UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* —Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.

- *Communications Satellites*—Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* —Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

E

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to what users perceive they are buying.

The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.

The specific industries (and their SIC codes) included under these generic industry sectors are detailed in the exhibit.

EXHIBIT A-1

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and Control Instruments
	39	Miscellaneous
Process Manufacturing	10	Metal Mining
	11	Anthracite Mining
	12	Coal Mining
	13	Oil and Gas Extraction
	14	Mining/Quarrying of Non-Metallic Minerals, except Fuels
	20	Food Products
	21	Tobacco
	22	Textile Products
	24	Lumber and Wood Products
	26	Paper Products
	28	Chemicals
	29	Petroleum
	30	Rubber and Plastics
	32	Stone, Glass, Clay
	33	Primary Metals
Transportation	40	Railroads
	41	Local Transit
	42	Motor Freight
	43	U.S. Postal Service
	44	Water Transportation
	45	Air
	46	Pipelines
	47	Transportation Services

EXHIBIT A-1a

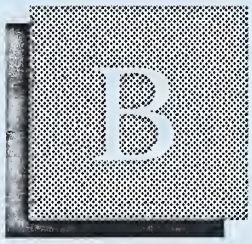
INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Utilities	49	Electric, Gas, and Sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable Goods
	51	Nondurable Goods
Retail Distribution	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
	59	Miscellaneous Retail
Banking and Finance	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
	67	Holding and Investment Offices
Insurance	63	Insurance (Life, Health, Etc.)
	64	Insurance Agents
Medical	80	Health Services
Education	82	Educational Services

EXHIBIT A-1b

INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Services	72	Personal Services
	73	Business Services (Excluding Information Services Companies Themselves)
	89	Miscellaneous Services
	66	Combinations of Real Estate, Insurance, Loans, Law Offices
	81	Legal Services
	76	Miscellaneous Repair
Federal Government	N/A	As Appropriate
State and Local Government	N/A	As Appropriate
Other Industries	01-09	Agriculture, Forestry, and Fishing
	15-17	Construction
	70	Hotels, Rooming Houses, Camps, and Other Lodging Places
	75	Automotive Repair, Services, and Garages
	78	Motion Pictures
	79	Amusement and Recreation Services, Except Motion Pictures
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
	86	Membership Organizations



Appendix: Market Data Base, 1988-1993

EXHIBIT B-1

INFORMATION SERVICES USER EXPENDITURE FORECAST BY DELIVERY SUBMODE
1987-1993
(In Millions of Dollars)

Delivery Mode	1987	87-88 Growth	1988	1989	1990	1991	1992	1993	CAGR 88-93
Professional Services	12719	18	15062	17783	20809	24362	28412	33154	17
Consulting	2516	24	3120	3830	4628	5592	6694	8014	21
Education & Training	1635	20	1960	2351	2794	3319	3907	4599	19
Software Development	7548	17	8831	10313	11946	13839	16010	18529	16
Systems Operations	1020	13	1151	1289	1442	1612	1801	2012	12

PROFESSIONAL SERVICES USER EXPENDITURE FORECAST BY SECTOR 1987 - 1993 (In Millions of Dollars)

Industry Sector	1987	1988	1989	1990	1991	1992	1993	CAGR 88-93
Discrete Manufacturing	2459	3122	3742	4452	5293	6273	7431	19
Process Manufacturing	1222	1491	1833	2237	2728	3316	4029	22
Transportation	145	166	196	229	267	311	363	17
Utilities	371	423	477	534	596	665	740	12
Telecommunications	613	679	813	936	1086	1255	1455	16
Retail Distribution	140	180	216	257	306	362	429	19
Wholesale Distribution	238	281	331	387	452	527	613	17
Banking & Finance	1602	1907	2247	2628	3071	3577	4165	17
Insurance	1047	1204	1419	1660	1939	2259	2630	17
Medical	260	299	355	419	494	581	682	18
Education	52	59	70	82	96	111	130	17
Services	103	117	138	162	189	220	256	17
Federal Government	2552	2908	3278	3667	4101	4531	5004	11
State & Local Government	1655	1937	2322	2762	3284	3892	4610	19
Other Industry Specific	260	288	345	397	460	532	617	16
Total Vertical-Markets:	12719	15062	17783	20809	24362	28412	33154	17
Total Information Services Industry:	12719	15062	17783	20809	24362	28412	33154	17